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Monthly Status Report

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SHUTTLE SYSTEMS WEIGHT AND PERFORMANCE

MONTHLY STATUS REPORT

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1.0 INTRODUCTION

The purpose of this document is to present the status of Shuttle systems weight and performance to provide visibility into the injected weight margin for the STS Missions 3-13 as defined by JSC 17379, "STS Flight Definition and Requirements Directive," and the Baseline Reference Missions (BRM). Control and status weights are reported monthly and are obtained from the responsible offices specified in JSC-07700, Volume X, Appendix 10.12. These weights along with ascent performance ground rules in Appendix 10.12 for BRM are used to status Shuttle injected weight margin. Mass properties can be found in JSC-08934, "Shuttle Operational Data Book, Volume II, Mission Mass Properties." Acronyms used for this document are based on JSC-07700, Volume I. Appendix A provides Mass Properties for the vehicle configurations as defined herein.

2.0 SYSTEM WEIGHT AND PERFORMANCE - STS MISSIONS

The status of Shuttle system total injected weight margin and pending changes are summarized in this section for the STS Missions 5-13.

This section consists of the Mission Summary of Lift Capability and Margin (Table 2.1), Payload Weight Summary (Table 2.2), STS Operator Weight Summary (Table 2.3), and Injected Weight Margin Changes (Table 2.4). Time histories of injected weight margin are also included (Figure 2.1). Potential changes that affect Lift Capability and Performance Margin (Table 2.8) are also shown.

TABLE 2.1 - MISSION SUMMARY, LIFT CAPABILITY AND MARGIN 09-17-82

MISSION	STS-05	STS-06	STS-07	STS-08	STS-09	STS-10	STS-11*	STS-12	STS-13
LAUNCH DATE	11/11/2	01/20/3	04/20/3	06/29/3	09/30/3	11/03/3	01/29/4	03/18/4	4/17/84
ORBITER	OV-102E	OV-099	OV-099	OV-099	OV-102E	OV-099	OV-102E	OV-103	OV-099
ET	ET-5	LWT-1	ET-6	LWT-2	LWT-3	LWT-4	LWT-5	LWT-6	LWT-7
SRB	STD/DFI	LWC/DFI	LWC/DFI	LWC/DFI	STD/DFI	STD/DFI	STD	LWC	LWC
CREW/DAYS	4M/5D	4M/3D	4M/6D	4M/4D	6M/9D		4M/7D	4M/5D	4M/5D
INCLINATION (DEGREES)	28.5	28.5	28.5	28.5	57.0		28.5	28.5	28.5
ALTITUDE (N.M.)	160	150	160	150	135		160	150	285*
Q MAX DISPERSED	785	785	785	785	785		785	785	785
SRM MOTOR	209-82(1)	90-82(1)	90-82(1)	HPM	HPM	HPM	HPM	HPM	HPM
SSME THROTTLE SETTING	100/100	104/104	104/104	109/109	104/107		102/109	109/109	109/109
P/L ASSIGNMENT	SBS C, TELE-SAT-E	TDRS-A	SPAS-1, PALAPA B1, TELE-SAT-F, OSTA-2	INSAT 1B, TDRS-B	SL-1	DOD	PALAPA B2, PDRS/ PFTA, LFC-1	MEA-1/ MPESS, TDRS-C	LDEF DEPL., SMRM/ FSS
WEIGHT SUMMARY									
PROJECTED MARGIN **	1951	-884	2257	2833	910		9282	7424	4697(2)
PROJECTED CHANGES (TABLE 2.8)	0	-2377	-2089	1052	-625		-602	-599	-1364
CURRENT MARGIN NOMINAL	1951	1493	4346	1781	1535		9884	8023	6061(2)
PAYLOAD	20483	47999	32511	55637	33089		28634	51091	32880
P/L CAPABILITY	22434	49492	36857	57418	34624		38518	59114	38941
RESERVE	0	3000	3000	3000	3000		3000	3000	3000
LIFT CAPABILITY	22434	52492	39857	60418	37624		41518	62114	41941
STS OPERATOR	11652	623	4308	1386	815		5515	1165	4147
ORBITER INERT	151968	149698	150001	150001	154862		154862	148065	150184
SSME X 3 INERT	20709	20816	20816	20816	20859		20859	20859	20816
PERSONNEL	3741	3614	3614	3614	3614		3614	3614	3614
NON-PROP. CONSUMABLES	5465	5496	5465	5465	6278		5456	5418	5418
OMS PROPELLANT	19800	19300	20500	20300	15500		19500	21100	25064
RCS PROPELLANT	7888	7416	7416	7416	7888		7888	7508	7416
MPS PROPELLANT UNEXPENDED	14081	13901	13880	13901	13901		13901	13901	13901
MPS PRESSURANTS	423	423	423	423	423		423	423	423
ET INERT	76228	67862	76491	68210	68551		68021	68021	67372
SHUTTLE SYSTEM AT MECO	334389	341641	342771	351950	330315		341557	352188	340296
SRB X 2 INERT	380456	372320	370277	374772	381926		380032	372878	372878
SRB X 2 PROPELLANT	2216514	2216970	2216970	2217504	2216048		2216048	2217504	2217504
MPS PROPELLANT EXPENDED	1557945	1558912	1553549	1558624	1558870		1550521	1552382	1554344
SHUTTLE SYSTEM AT SRB IGNITION	4489304	4489843	4483567	4502850	4487159		4488158	4494952	4485022

(1) SPECIFIC VERSION OF GENERIC 86-80E MOTOR

(2) DOES NOT REFLECT TRUE MARGIN SINCE MISSION IS OMS CRITICAL.

* UNDER REVIEW

** PROJECTED MARGIN IS SUM OF CURRENT MARGIN AND PROJECTED CHANGES.

TABLE 2.2 PAYLOAD WEIGHT SUMMARY

MISSION	STS-05	STS-06	STS-07	STS-08	STS-09	STS-10	STS-11	STS-12	STS-13
ORBITER	OV-102E	OV-099	OV-099	OV-099	OV-102E	OV-099	OV-102E	OV-103	OV-099
PAYLOAD DETAIL									
MV0073A P/L ATTACH HDW	OPC	451	OPC	451	1502			451	
MV0073A RETENTION FTG. ALLOW.					-675				
MV0520A-ATCS RAD. PANELS					355				
MV0525A-EPS TANK SET 4 HDW					722				
MV0525A EPS TANK SET 4 CRYO					873				
MV0610A MID DECK SEAT					101				
MV0702A-P/L TIME BUFFER	3	3	3	3	3		3	3	3
MV0712A-SMCH	OPC	786	OPC	786				786	
INSAT 1B + SSUS-D--DEPLOY				7345					
--ASE				2394					
TDRS + IUS-2 STAGE--DEPLOY		37507		37507				37507	
IUS-ASE		5843		5843				5843	
PAYLOAD RECORDER		60		60				60	
WEIGHT GROWTH ALLOWANCE		207		207				207	
MEA-1 PAYLOAD								4165	
MPESS CARRIER								1185	
SPAS 01			3967						
OSTA-2			4469						
PALAPA B1,B2 + PAM-D--DEPLOY			7531				7531		
--ASE			2394				2394		
TELESAT E,F + PAM-D--DEPLOY	7365		7542						
--ASE	2394		2394						
SBS-C + PAM-D--DEPLOY	7218								
--ASE	2389								
SL-1 PAYLOAD/CARRIER					27574				
SL INTERFACE CABLES					937				
A/L ADAPTER,MOD,DUCT					1022				
PERSONNEL					493				
PDRS/PFTA							8500		
LFC-1							2629		
LFC-1 CARRIER							1371		
LDEF									22000
SMM REPAIR PAYLOAD									10000
MMU									600
P/L UTILITY KITS	46								
--PRIMARY PAYLOAD SUB-TOTAL--	19415	44857	28300	54596	32907		22428	50207	32603
MV0402A FWD FUS SUPT OEX							36		
MV0403A SUMS							85		
MV0565A-SILTS							410		
MV0570A ACIP	182	182	182	182	182		182		182
MV0575A TILE GAP EXPERIMENT	7								
MV0577A-SEADS							101		
MV0581A ACIP/OEX RECORDER	95	95	95	95			95		95
MV0736A-MLR EXPERIMENT		170							
CFES EXPERIMENT		764	764	764					
GET AWAY SPECIAL(NO. OF CANS)	635(1)	1796(4)	3170(7)				5284(12)	884(2)	
NOSL EXPER.		52							
PCM SLAVE							13		
STUDENT EXPERIMENTS+GLOW	99								
MATERIALS TEST EXPER	50								
EEVT		83							
--ANCILLARY PAYLOAD SUB-TOTAL--	1068	3142	4211	1041	182		6206	884	277
TOTAL PAYLOAD------	20483	47999	32511	55637	33089		28634	51091	32880

OPC - Operator Chargeable

TABLE 2.3 STS OPERATOR WEIGHT SUMMARY

MISSION	STS-05	STS-06	STS-07	STS-08	STS-09	STS-10	STS-11	STS-12	STS-13
ORBITER	OV-102E	OV-099	OV-099	OV-099	OV-102E	OV-099	OV-102E	OV-103	OV-099
MV0082A-RMS ARM	-1001	-935	INC	-935	-1001	INC	INC	-935	INC
MV0544A-EPS TANK SET 3	INC	INC	INC	INC	INC	INC	INC	INC	INC
MV0610A MISSION SPEC. SEAT	101	INC	INC	INC	INC	INC	INC	INC	INC
MV0610A PAYLOAD SPEC. SEAT	DE	INC	INC	INC	INC	INC	INC	INC	INC
GALLEY	DE	-164	-164	-164	INC	INC	INC	INC	INC
H2O DISPENSING SYSTEM	INC	23	23	23	N/A	N/A	N/A	N/A	N/A
MV0073A-ORB. P/L FTG. ALLOW.	INC	INC	INC	INC	INC	INC	INC	INC	INC
RENDEZVOUS RADAR	DE	DE	INC	INC	INC	INC	INC	INC	INC
REDUCE LIOH RACKS	-58								
REDUCE P/L BAY LINER	-150								
REMOVE EJECTION SEAT BALLAST	-50				-50		-50		
REMOVE SEAT VENT SYS.	-39				-39		-39		
REMOVE PARACHUTES	-28				-28		-28		
REMOVE SURVIVAL KITS	-56				-56		-56		
--MANIFEST SUB-TOTAL--	-1281	-1076	-141	-1076	-1174		-173	-935	
MV0073A P/L ATTACH HDW	2206	1126	2751	1915	PC		2627	1701	1940
MV0073A RETENTION FTG. ALLOW.	-675	-675	-675	-675	PC		-675	-675	-675
MV0073A I/F HDW ALLOW.	N/A	-451	N/A	-451	N/A		N/A	-451	N/A
MV0400A MADS 1	94	4	4	4	94		94		4
MV0408A-MADS 2		653	653	653					653
MV0412A-S-BAND FM		22	22	22	22		22	22	22
MV0520A-ATCS RAD. PANELS	355	355	355	355	PC		355	355	355
MV0525A-EPS TANK SET 4 HDW.	223	208	208	208	PC		722	717	717
MV0541A VIBRO ACOUSTIC CAB	7								
MV0542A DFI ASSY.	9832								
MV0548A-CCTV CAMERA	72	72	72	72	72		72	72	72
MV0550A-AFT STA CONTAINERS	48	48	48	48	48		48	48	48
MV0564A PD+RS SYS. TEST-VTR	65	65	65	65	65		65	65	65
MV0566A-EPS TANK SET 5 HDW					684		684		
MV0578A DAC WIRING	5				5		5		
MV0610A MID-DECK SEAT 1	101				101				
MV0704A PALLET UTILITY KIT									
MV0711A X603 INTFC HARNESS	86	86	86	86	86		86	86	86
MV0712A-SMCH	167	2	702	2			702	2	702
MV0713A-1307 B/H P/L WIRING		97	97	97	97		97	97	97
MV0719A-AFT FLT DECK HARNESS		40	40	40	40		40	40	40
MV0720A P/L RECDR CABLE	1	1	1	1	1		1	1	1
MV0722A-STD SW PANEL	20	20	20	20	20		20	20	20
MV0725A SIP SMCH	38				38				
MV0729A GAS AFD JUMPER SET	1								
MV0761A MICRO MOD P/L UTIL	138								
PERSONNEL					493				
BALLAST PROVISIONS	22				22		22		
AUXILIARY O2 HARDWARE	75				75		75		
ONBOARD H2 DETECTION	26	26							
P/L UMBIL + OEX PROV	26				26		26		
MMU							600		
--OPERATOR SUB-TOTAL--	12933	1699	4449	2462	1989		5688	2100	4147
TOTAL STS OPERATOR--------	11652	623	4308	1386	815		5515	1165	4147

INC - Included in Orbiter Inert Weight.

DE - Deferred Effectivity

N/A - Not Applicable.

PC - Payload Chargeable.

TABLE 2.4 SHUTTLE SYSTEM INJECTED WEIGHT MARGIN CHANGES - STATUS 09-17-82

ITEM	STS-005 OV-102E ET-05 A15 A16	STS-006 OV-099 LWT-01 A17 A18	STS-007 OV-099 ET-06 A19 A20	STS-008 OV-099 LWT-02 A21 A22	STS-009 OV-102E LWT-03 A23 A24	STS-010 OV-099 LWT-04 A25 A26	STS-011 OV-102E LWT-05 A27 A28	STS-012 OV-103 LWT-06 A29 A30	STS-013 OV-099 LWT-07 A31 A32
INJECTED WEIGHT MARGIN 07-30-82	973	1573	2978	-2657	5169		9071	5879	NOT REPORTED
MPS PROPELLANT UNEXPENDED (TABLE 9)	148		64						
ORBITER (TABLE 4.1)	-30	-18	-18	-18	-4924		-1773	7	
NON-PROP CONSUMABLES (TABLE 4.7)	38	-9	-9	169	-920		-47	-9	
OMS (TABLE 4.7)	-700		500	1800					
RCS (TABLE 4.7)		92	92	92	-380				
PERSONNEL (TABLE 5.1)	244								
PAYLOAD (TABLE 2.6)	-24	266	986	705	46		-2	343	
STS OPERATOR (TABLE 2.7)	902	-74	72	-74	-246		774	-58	
SSME X 3 (TABLE 6.1)					-43				
ET (TABLE 7.1)		908		394	83		561	561	
TOTAL ELEMENT WEIGHT UPDATES	578	1165	1687	3068	-6384		-487	844	
TOTAL PERFORMANCE CHANGES (TABLE 2.5)	400	-1245	-319	1370	2750		1300	1300	
SSPO INJECTED WT MARGIN (NOMINAL)	1951	1493	4346	1781	1535		9884	8023	6061

TABLE 2.5 - BRIEF DESCRIPTION OF PERFORMANCE CHANGES - STATUS 09-17-82

ITEM	STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
NEW Q-ALPHA PROFILE				-150	-150		-150	-150	
SIM UPDATE (2)	301			70	-800				
SSME THROTTLE SETTING (3)					2250				
NEW SRB 46-82-BURN RATE				350	350		350	350	
-CORR OF USABLE PROP				650	650		650	650	
5.4 LOADS UPDATE				-250	-250		-250	-250	
SRB BURN RATE 90-82		-445	500						
MPS UPDATE	99		-19						
AXIAL FORCE UPDATE		-800	-800	-800	-800		-800	-800	
ADAPTIVE THROTTLING				1000	1000		1000	1000	
SSME PITCH PARALLELING				500	500		500	500	
SRB X 2 (1) (TABLE 8.1)									
SSPO RPTED PERFORMANCE CHANGES	400	-1245	-319	1370	2750		1300	1300	

(1) EQUIVALENT MARGIN = WT / 10.
(2) BASED ON DATA SUBMITIALS: 689ADD3E 711ADD1
(3) SSME THROTTLE INCREASES: 102/104

TABLE 2.6 - PAYLOAD WEIGHT CHANGES - STATUS 09-17-82

ITEM	STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
P/L STATUS 07-30-82	20459	48265	33497	56342	33135	28632	51434	32880	
ADD STUDENT EXPERIMENTS + GLOW	99								
ADD MATERIALS TEST EXPERIMENT	50								
EPS TANK SET 4 UPDATE					-57				
ADD ARM RESTS TO SEATS(S21694)					9				
MLR DELETION/UPDATE	-170	-5							
SPAS + OSTA UPDATE			-874						
P/L TIMING BUFFER		3	3	3	3	3	3		
TDRS UPDATE		-346		-346			-346		
INSAT UPDATE				-361					
SL1 UPDATE					-18				
ADD EEVT (S21067AR2)		83							
ACIP UPDATE	-1	-1	-1	-1	-1	-1			
P/L UTILITY KITS	46								
DELETE ACIP RECORDER					-95				
PERSONNEL UPDATE FOR 6M/9D					113				
TELESAT UPDATE			-114						
SSPO RPTED P/L CHANGES	24	-266	-986	-705	-46	2	-343		
SSPO RPTED P/L STATUS	20483	47999	32511	55637	33089	28634	51091	32880	

TABLE 2.7 - STS OPERATOR WEIGHT CHANGES - STATUS 09-17-82

ITEM	STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
STS OPERATOR STATUS 07-30-82	12554	549	4380	1312	569	6289	1107		
MANIFEST (S21566R1)									
REDUCE LIOH RACKS	-58								
REMOVE P/L LINER	-150								
REMOVE FLOOD LIGHT BULBS									
REMOVE EJECT SEAT BALLAST	-50				-50	-50			
REMOVE SEAT VENT SYS	-39				-39	-39			
REMOVE PARACHUTES+SEAT CUSH	-28				-28	-28			
REMOVE SURVIVAL KITS	-56				-56	-56			
PRSD TANK SET 4 UPDATE	-57	-62	-62	-62		-57	-62		
ADD ARM RESTS(S21694)	18				9				
RMS DELETION UPDATE	-22				-66				
DELETE S-BAND FM	-22								
DELETE P/L RECORDER	-60		-60		-60	-60			
DELETE 1307 P/L WIRING/UPDATE	-80	17	17	17	17	17	17		
P/L UMBIL + OEX PROV	26				26	26			
ACOUSTIC CABLES	7								
DFI UPDATE	-68								
SMCH UPDATE	-274	86		86	124		86		
VTR PNL UPDATE	-4	-4	-4	-4	-4	-4	-4		
ATTACH HDW UPDATE	-22								
MADS UPDATE	16	16	16	16	-547	-1303			
STD SW PNL	20	20	20	20	20	20	20		
P/L RECORDER CABLE	1	1	1	1	1	1	1		
BALLAST PROV+DAC WIRING					27				
PERSONNEL UPDATE FOR 6M/9D					113				
EPS TANK SET 5 HDW					684	684			
AUX O2 HDW					75	75			
TOTAL SSPO RPTED STS OP CHANGES	-902	74	-72	74	246	-774	58		
SSPO RPTED STS-OP STATUS	11652	623	4308	1386	815	5515	1165	4147	

TABLE 2.8 - PROJECTED WEIGHT MARGINS - STS-005 THROUGH STS-013 09-17-82

		STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
CURRENT MARGIN	1951	1493	4346	1781	1535		9884	8023	6061
ORBITER INERT WEIGHT		65	65	65	30		30	816	65
SRB X 2 INERT WEIGHT		-21	-21	295	295		295	295	295
ADOPT STANDARD I LOADS			539		-400		-400	-400	
VEHICLE ISP BIAS		-2300	-2300	-2300	-2300		-2300	-2300	-2300
REDUCE CREW EQUIP TO MEET MISSION REQUIREMENTS		293	42	293				113	113
DELETE 3RD CRYO TANK SET/ADD AUX O2				1363					
ASCENT 5.4 LOADS RELIEF				1750	1750		1750	1750	1750
FILL 4TH CRYO TANK SET							-873	-873	-873
RCS OVERFILL		-414	-414	-414					-414
OV-102 OPERATIONAL WEIGHT							1769		
FILL 5TH CRYO TANK SET							-873		
TOTAL PROJECTED MARGIN CHANGES		-2377	-2089	1052	-625		-602	-599	-1364
PROJECTED MARGIN	1951	-884	2257	2833	910		9282	7424	4697

TABLE 2.9 - BRIEF DESCRIPTION OF POTENTIAL CHANGES TO LIFT CAPABILITY STS-5 THROUGH 13

ORBITER INERT WEIGHT	VEHICLE DEPENDENT

A LIST OF ORBITER INERT WEIGHT POTENTIAL CHANGES INCLUDING WEIGHT SAVERS IS GIVEN IN TABLE 4.4.

SRBX2 INERT WEIGHT	VEHICLE DEPENDENT

A LIST OF SRB INERT WEIGHT POTENTIAL CHANGES IS GIVEN IN TABLE 8.2.

STANDARD I-LOAD	-400

THE I-LOAD DESIGN FOR OFT IS CONFIGURED FOR THE EXPECTED MONTH OF LAUNCH. IF THE I-LOAD WAS CONFIGURED BASED ON SEASONAL CHARACTERISTICS, A PENALTY OF 400 LBS COULD OCCUR FOR THE NOMINAL LAUNCH.

VEHICLE ISP BIAS	-2300

ASSESSMENT OF STS-2 FLIGHT DATA CURRENTLY INDICATES A VEHICLE ISP OF -1.9 SEC LOW AS OPPOSED TO -2.7 SEC LOW REPORTED ON STS-1. THE TOTAL BIAS FOR SUBSEQUENT MISSIONS IS ESTIMATED AS -2300 LBS OF MARGIN.

CREW EQUIPMENT TO MEET MISSION REQUIREMENTS	MISSION DEPENDENT

CREW EQUIPMENT COULD BE REDUCED IF CURRENT 7 DAY REQUIREMENT IS REDUCED TO MEET MISSION REQUIREMENTS.

DELETE 3RD CRYO TANK SET	1363

MISSION REQUIREMENTS MAY REQUIRE THE 3RD CRYO TANK SET. HOWEVER, PROVISIONS ARE BEING MADE TO DELETE IT IF IT IS NOT NEEDED.

ASCENT 5.4 LOADS RELIEF	1500

UPON COMPLETION OF THE 5.4 LOADS ASSESSMENT THE ASCENT TRAJECTORY WHICH IS CONSTRAINED BY q VS MACH MAY BE RELIEVED. THIS AFFECT MAY BE DIFFERENT FOR EACH MISSION.

FILL 4TH CRYO TANK SET	-873

IF THE FOURTH CRYO TANK SET CANNOT BE FLOWN EMPTY THE RESULTING PENALTY IS 873 LBS.

RCS OVERFILL	414

THE CURRENT PHILOSOPHY IS TO OVERFILL THE FIRST FLIGHT OF OV-099 (STS-6) AS WAS DONE ON OV-102. THIS RESULTS IN A PENALTY OF 414 LBS. THE REMAINING OV-099 FLIGHTS MAY ALSO BE OVERFILLED.

CHANGE TO OV-102 OPERATIONAL WEIGHT

IF THE MAIN MAXI-MOD IS MADE TO OV-102 SUCH AS REMOVING EJECTION SEATS, ETC THE PERFORMANCE GAIN IS 1769 LBS.

FILL 5TH CRYO TANK SET

IF THE FIFTH CRYO TANK SET CANNOT BE FLOWN EMPTY THE RESULTING PENALTY IS 873 LBS.

3.0 SYSTEM WEIGHT AND PERFORMANCE - BRM MISSIONS

The status of Shuttle system total injected weight margin, control weights, and pending changes are summarized in this section for the BRM missions.

This section consists of BRM Mission Descriptions (Table 3.1), Level II Control Weight Changes (Table 3.2), Mission Summary of Lift Capability and Margin (Table 3.3), Injected Weight Margin Changes (Tables 3.5 and 3.6), and Projected Weight Margins (Table 3.6). Space Shuttle capability evolutions for BRM-1Y and BRM-4Y are shown in Figures 3.1.1 and 3.1.2. The variation of payload capability with orbit inclination based on groundrules defined by BRM-1Y for ETR launches, and BRM-4Y for WTR launches are shown in Figure 3.2.

TABLE 3.1 - BRM MISSION DESCRIPTIONS

Mission 1. Mission 1 is a payload delivery mission to a 150 n. mi. circular orbit. The mission will be launched due east and requires a payload capability of 65,000-lb. The purpose of this mission is either the placement in orbit of a 65,000-lb satellite or the placement in orbit of a 65,000-lb satellite and retrieval from orbit of a 32,000-lb satellite. The Orbiter-vehicle on-orbit translational delta V requirements in excess of a 50 X 100 n. mi. reference orbit are 650 ft/sec from the orbital maneuvering subsystem (OMS) and 100 ft/sec from the RCS. The injected margin is based on an SRB mean bulk temperature at 60°F and a first stage maximum dynamic pressure of 680 psf. Other ground rules are described in JSC-07700, Space Shuttle Flight and Ground System Specification, Volume X, Appendix 10.12.

Mission 3A. Mission 3A is a payload delivery mission to an orbit at 104° inclination and return to the launch site. The boost phase shall result in an insertion into an orbit with a minimum apogee of 100 n. mi., as measured above the earth's equatorial radius. The Orbiter-vehicle on-orbit translation delta V requirements in excess of a 50 X 100 n. mi. reference orbit are 250 ft/sec from the OMS and 100 ft/sec from the RCS. The ascent payload requirement is 32,000 lb. For mission performance and consumables analyses, a return payload of 2500 lb will be assumed (the 2500 lb is included in the 32,000 lb ascent payload weight). The injected margin is based on an SRB mean bulk temperature of 52°F and a first stage maximum dynamic pressure of 650 psf. Other ground rules are described in JSC-07700, Space Shuttle Flight and Ground System Specification, Volume X, Appendix 10.12.

Mission 4. Mission 4 is a payload delivery and retrieval mission of a modular spacecraft weighing 32,000 lb at lift-off. The mission will deploy a spacecraft weighing 29,000 pounds in a 150 n. mi. circular orbit at 98 degrees inclination within two revolutions after lift-off. A passively cooperative, stabilized spacecraft, weighing 22,500 pounds, will be retrieved from a 150 n. mi. circular orbit and returned to VAFB. The mission length, including contingencies, will be 7 days. For mission performance and consumables analyses, a cradle weight of 2,500 lb will be assumed to be included in the ascent payload weight, but must be added to the retrieved payload weight. The RCS will be loaded full and the minimum on-orbit translation, delta-velocity from the OMS, including post-MECO insertion burn, is a total of 1050.5 ft/sec. The total injected margin is based on a first stage maximum dynamic pressure of 650 psf and includes 1730 lb for the SRB mean bulk temperature of 52°F. Standard provisions shall be included for personnel and stowed equipment. Contingency EVA capability shall be provided.

Mission 1Y, 4Y. The new BRM-1Y and BRM-4Y missions are assumed to have the same payload requirements as BRM-1 and BRM-4, respectively. The new missions are planned for one day with two crewmen. It is assumed that the non-propulsive consumables, personnel and RCS propellants are loaded in accordance with BRM-3A. The OMS propellants are based on delta-velocity required for orbit insertion, circularization and deorbit. For BRM-1Y, the delta-velocity requirement is 690 ft/sec and for BRM-4Y, the delta-velocity is 1000 ft/sec. The difference is attributable to MECO velocity reduction at WTR for ET disposal.

TABLE 3.2 - LEVEL II CONTROL WEIGHT CHANGES

	Level II Change Request	Control Weight, lb								
		Orbiter			SSMEX3	ET	SRBX2			
		OV-103	OV-099	OV-102 OPER		Light (LWT-7)	Heavy 86-80	Light 86-80	Light HPM	Heavy HPM
JULY 1982 Control Weight, lb		142483	144744	145549	21015	69927	372522	365822	369000	375600
No change this report										
September 1982 Control Weight, lb		142483	144744	145549	21015	69927	372522	365822	369000	375600

BRIEF DESCRIPTION FOR LEVEL II CONTROL WEIGHT CHANGES

ADAPTIVE THROTTLING (1ST STAGE ONLY)

ON-BOARD SOFTWARE CHANGE TO PROVIDE CLOSED-LOOP (ADAPTIVE THROTTLE AND ALPHA SHAPING) GUIDANCE DURING FIRST STAGE RESULTS IN A PERFORMANCE GAIN OF 1000 LBS, BY ALLOWING AN INCREASE IN MAX Q AND A REDUCTION OF FPR.

SSME PITCH PARALLELING

THE SSME's NORMALLY GIMBAL ABOUT THE NULL POSITION (-16°, -10°, -10°) IN THE PITCH PLANE. IF THESE ENGINES CAN BE REORIENTATED TO AN INITIAL POSITION OF 6° BELL DOWN (-10°, -4°, -4°) TO REDUCE COSINE LOSSES. THIS RESULTS IN A PERFORMANCE IMPROVEMENT OF 500 LBS AT THE 109% POWER LEVEL DEPENDENT ON RESULTS OF HEATING ANALYSIS.

TABLE 3.3 BRM MISSION SUMMARY, LIFT CAPABILITY AND MARGIN STATUS 09-17-82

MISSION (1)	1	1Y	3A	4	4Y
LAUNCH DATE	WINTER	WINTER	WINTER	WINTER	WINTER
ORBITER	OV-103	OV-103	OV-103	OV-103	OV-103
ET	LWT-7	LWT-7	LWT-7	LWT-7	LWT-7
SRB	LWC/ETR	LWC/ETR	LWC/WTR	LWC/WTR	LWC/WTR
CREW/DAYS	4M/7D	2M/1D	2M/1D	4M/7D	2M/1D
INCLINATION (DEGREES)	28.5	28.5	104	98	98
ALTITUDE (N.M.)	150	150	100	150	150
Q MAX	680	680	650	650	650
SSME THROTTLE SETTING	109/109	109/109	109/109	109/109	109/109

WEIGHT SUMMARY	CONTROL	STATUS	CONTROL	STATUS	CONTROL	STATUS	CONTROL	STATUS	CONTROL	STATUS
PROJECTED MARGIN (AOA)(2)	1779	3199	4336	5805	938	4948	-4300	-446	-180	3723
PROJECTED CHANGES(TABLE 3.6)		5069		5069		7569		7569		7569
CURRENT MARGIN (AOA)	1779	-1870	4336	736	938	-2621	-4300	-8015	-180	-3846
PAYLOAD	65000	65000	65000	65000	32000	32000	32000	32000	32000	32000
P/L CAPABILITY	66779	63130	69336	65736	32938	29379	27700	23985	31820	28154
MANAGERS RESERVE	613		613		-581		583		583	
LIFT CAPABILITY (3)	67392	63130	69949	65736	32357	29379	28283	23985	32403	28154
STS OPERATOR			-444	-519	-444	-519			-444	-519
ORBITER INERT	142483	148065	142483	148065	142483	148065	142483	148065	142483	148065
SSMEX3 INERT	21015	20859	21015	20859	21015	20859	21015	20859	21015	20859
PERSONNEL	2644	3614	1465	2461	1465	2461	2644	3614	1465	2461
NON-PROP. CONSUMABLES	4749	4749	3942	3942	3942	3942	4749	4749	3942	3942
OMS PROPELLANT	19700	19700	18800	18800	15095	15095	25064	25064	23362	23362
RCS PROPELLANT	7508	7508	7508	7508	7508	7508	7508	7508	7508	7508
MPS PRESSURANT	423	423	423	423	423	423	423	423	423	423
MPS PROPELLANT UNEXPENDED	13346	13346	13346	13346	13233	13233	13233	13233	13233	13233
ET INERT	69927	67372	69927	67372	69927	67372	69927	67372	69927	67372
SHUTTLE SYSTEM AT MECO	349187	348766	348414	347993	307004	307818	315329	314872	315317	314860
SRBX2 INERT	369000	372878	369000	372878	369000	372878	369000	372878	369000	372878
SRBX2 PROPELLANT	2216742	2217504	2216742	2217504	2216742	2217504	2216742	2217504	2216742	2217504
MPS PROPELLANT EXPENDED	1563153	1566768	1560596	1564162	1565301	1567632	1569375	1573026	1565555	1568857
SHUTTLE SYSTEM AT SRB IGN.	4498082	4505916	4494752	4502537	4458047	4465832	4470446	4478280	4466614	4474099

(1) FOR BRIEF DESCRIPTION SEE TABLE 3.1.
(2) PROJECTED MARGIN INCLUDES USE OF FWC AT WTR.
(3) P/L LIMITED TO 65000 LBS. FOR LANDING WEIGHT.

TABLE 3.4 - SHUTTLE SYSTEM INJECTED WEIGHT MARGIN CHANGES - STATUS

MISSION	BRM-1	BRM-1Y	BRM-3A	PRM-4	PRM-4Y
ORBITER ET/SRB	OV-103 LWT/HWT	OV-103 LWT/LWT	OV-103 LWT/LWT	OV-103 LWT/LWT	OV-103 LWT/LWT
July 1982 INJECTED WEIGHT MARGIN, LB	-4106	-1500	-4857	-10251	-6082
1. ELEMENT STATUS WEIGHT UPDATES	(736)	(736)	(736)	(736)	(736)
ORBITER (TABLE 4.1)	7	7	7	7	7
NON-PROP CONSUMABLES (TABLE 4.7)					
OMS (TABLE 4.7)					
RCS (TABLE 4.7)					
PERSONNEL (TABLE 5.1)					
PAYLOAD (TABLE 2.6)					
STS OPERATOR (TABLE 2.7)					
SSMEX3 (TABLE 6.1)					
ET LWT-7 (TABLE 7.1)	729 (1)	729 (1)	729 (1)	729 (1)	729 (1)
MPS PROP UNEXPENDED (TABLE 9)					
2. PERFORMANCE CHANGES	(1500)	(1500)	(1500)	(1500)	(1500)
SRB X 2 (TABLE 8.1)					
SSME PITCH PARELLELING	500	500	500	500	500
ADAPTIVE THROTTLING	1000	1000	1000	1000	1000
SEPTEMBER 1982 INJECTED WEIGHT MARGIN, LB (AOA)	-1870	736	-2621	-8015	-3846

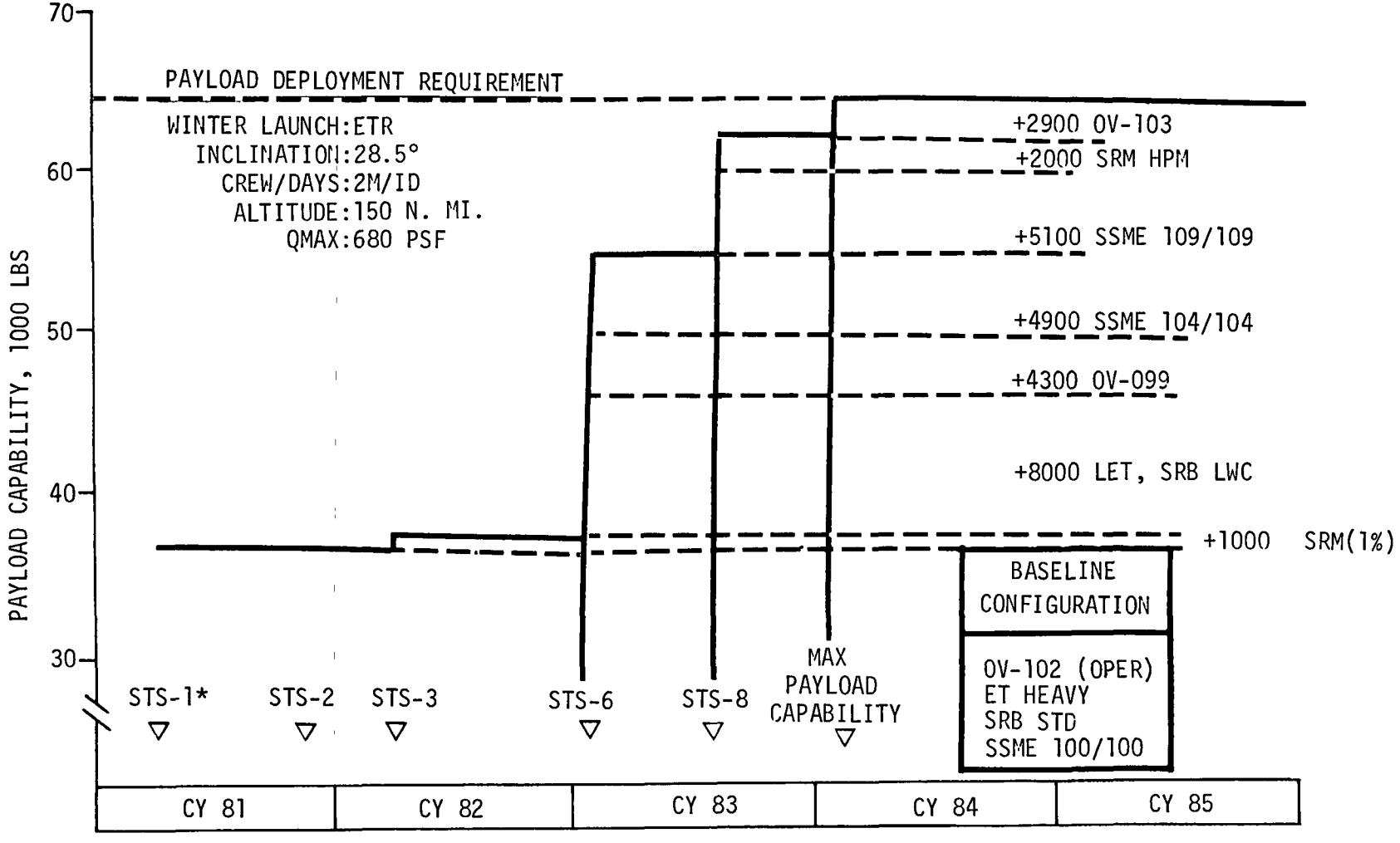
(1) 165 lbs reported last report (Table 7.1) not recorded this table.

TABLE 3.6 - PROJECTED WEIGHT MARGINS - BRM's & PRM's 09-17-82

Mission Orbiter	BRM-1 OV-103	BRM-1Y OV-103	BRM-3A OV-103	PRM-4 OV-103	PRM-4Y OV-103
Current Margin	-1870	736	-2621	-8015	-3846
Orbiter Inert Weight	816	816	816	816	816
SSMEX3 Inert Weight	-18	-18	-18	-18	-18
Et Inert Weight	0	0	0	0	0
SRBX2 Inert Weight	-21	-21	-21	-21	-21
SSME Insulation	42	42	42	42	42
SSME Interstage Seal	1675	1675	1675	1675	1675
Non-Propulsive Consummables	-926	-926	-926	-926	-926
*WTR Motor at ETR	--	--	N/A	N/A	N/A
*Deletion of SRB ignition delay	--	--	--	--	--
*Delete SRB Recovery System	--	--	--	--	--
HPM Exit Area	-480	-480	-480	-480	-480
*2 /1 FPR at Mode Boundary	--	--	--	--	--
Reduced FPR for MPS Loading	530	530	530	530	530
*Delete Range Safety Systems	--	--	--	--	--
Filament Wound SRM Case	--	--	5500	5500	5500
MPS Optimized FB and DB	307	307	307	307	307
MPS Ullage Pressure	144	144	144	144	144
Shape Nominal (TAL)	3000	3000	--	--	--
Total Projected Changes	5069	5069	7569	7569	7569
Projected Margin	3199	5805	4948	-446	3723

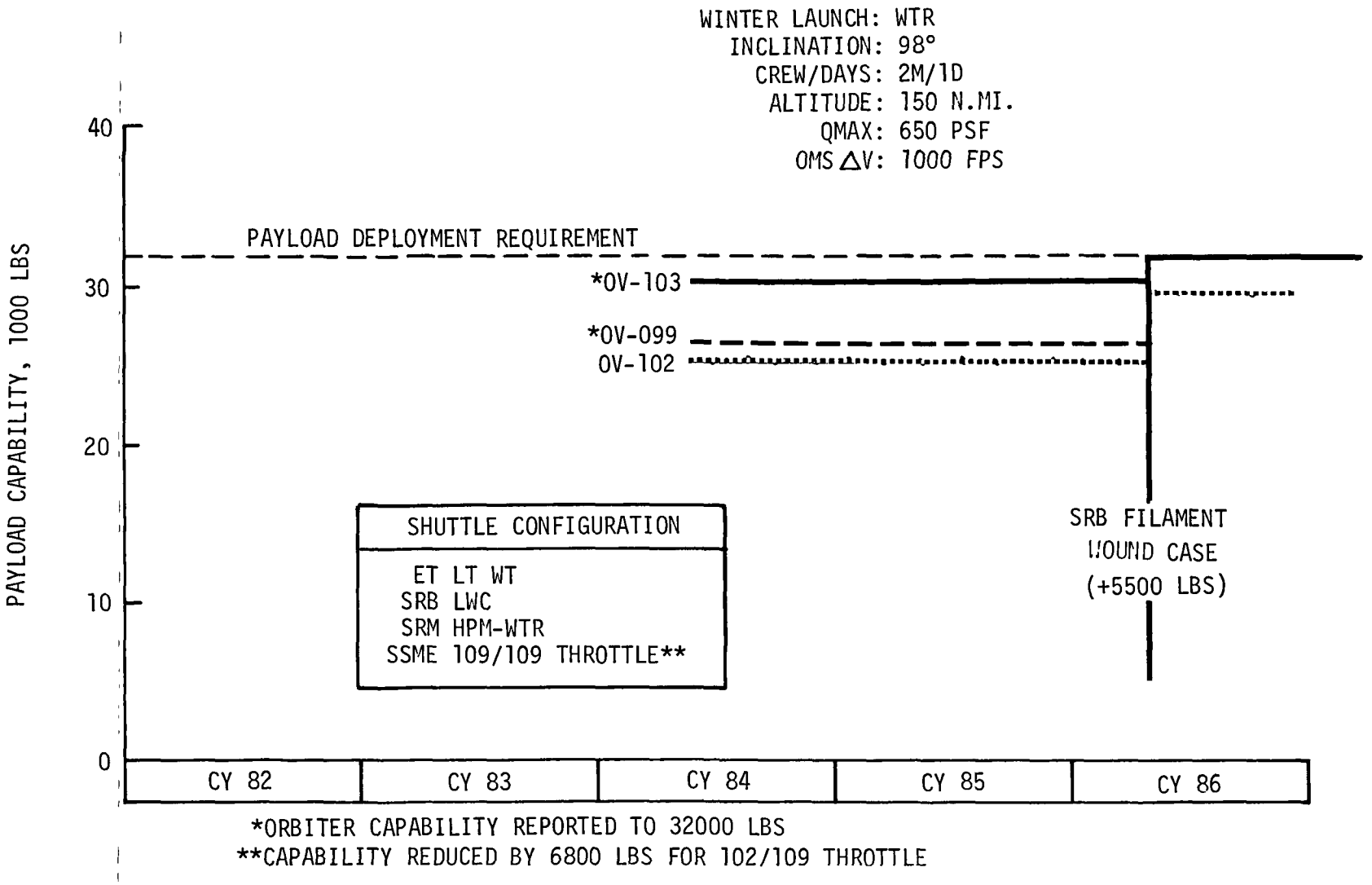
* Not included - Mission Specific Considerations Only

FIGURE 3.1.1 - SPACE SHUTTLE CAPABILITY EVOLUTION - REFERENCE MISSION - 1Y



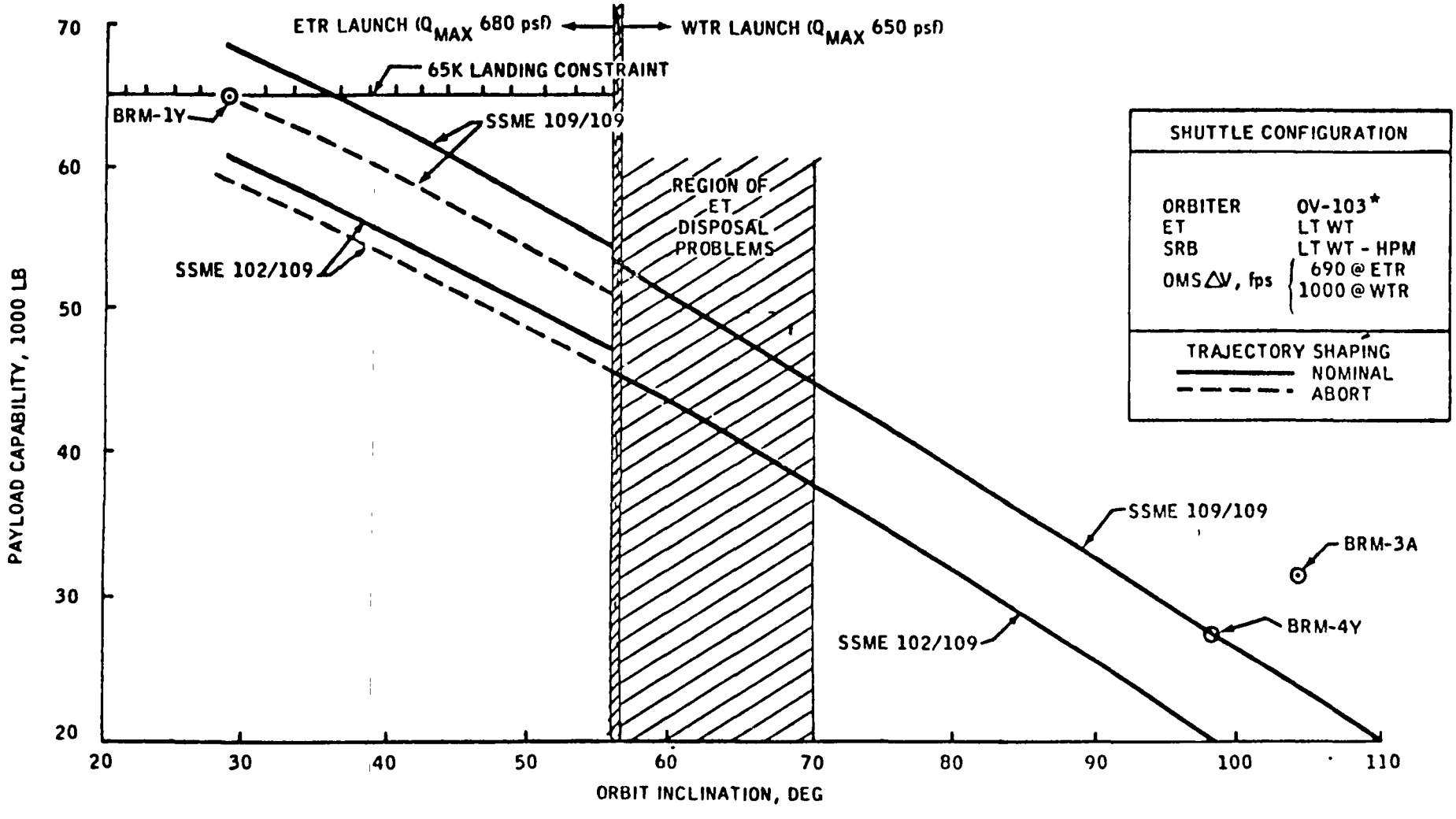
*STS-1 THROUGH STS-8 DENOTES ET, SRB, SRM, AND SSME THROTTLE CONFIGURATION PER FDRD (JSC 17379 REV D, CHANGE 8); HOWEVER, ORBITER CONFIGURATION AND ALL OTHER GROUND RULES ARE PER BRM-1Y.

FIGURE 3.1.2- SPACE SHUTTLE CAPABILITY EVOLUTION - REFERENCE MISSION - 4Y



*ORBITER CAPABILITY REPORTED TO 32000 LBS
**CAPABILITY REDUCED BY 6800 LBS FOR 102/109 THROTTLE

FIGURE 3.2 - SPACE SHUTTLE PAYLOAD DEPLOYMENT CAPABILITY VS INCLINATION
(CREW/DAYS 2M/1D, ORBIT ALTITUDE 150 N. MI.)



* BASED ON PROJECTED WEIGHT JSC-09095-65 (JUNE 1982)

FIGURE 3.3.1 TIME HISTORY INJECTED WEIGHT MARGIN BRM-1

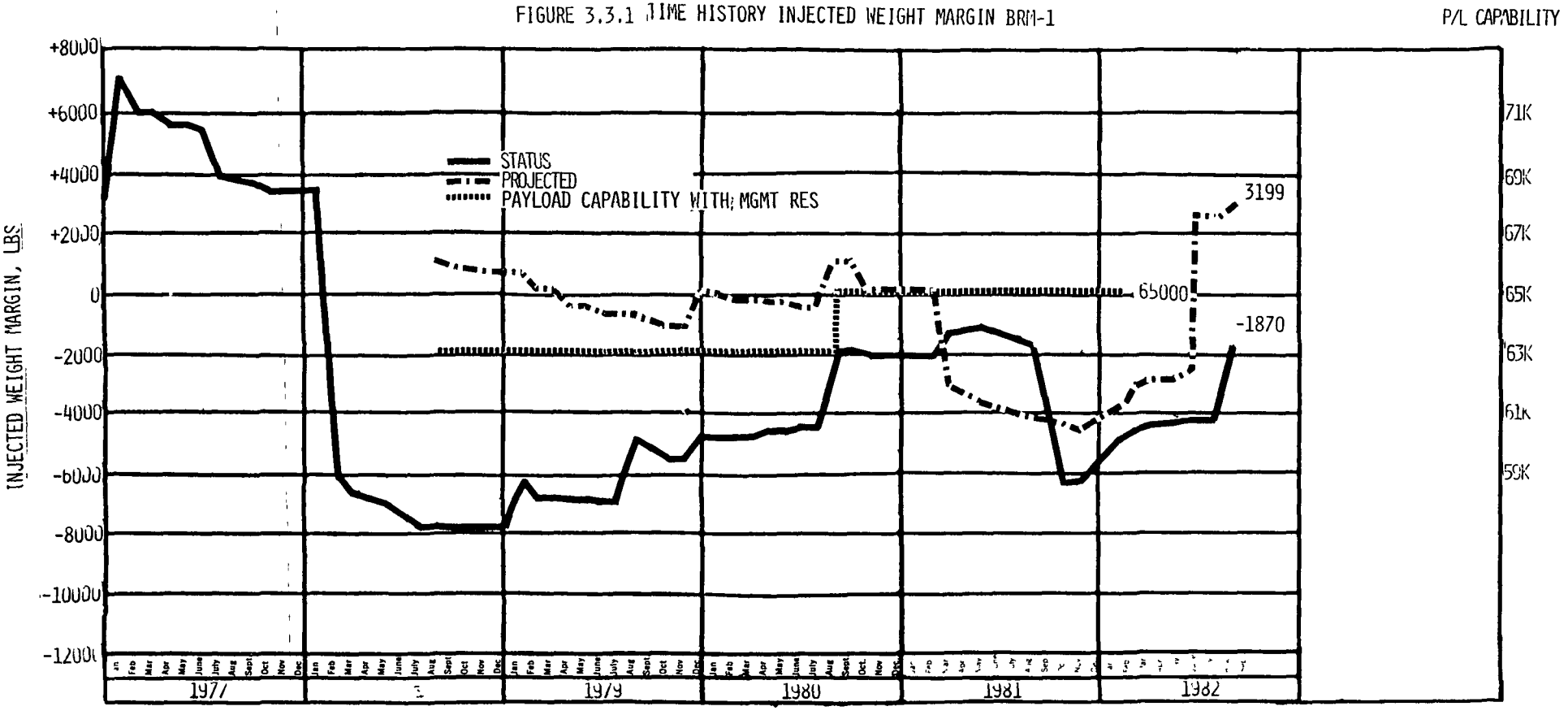


FIGURE 3.3.2 ,TIME HISTORY INJECTED WEIGHT MARGIN BRM-3A

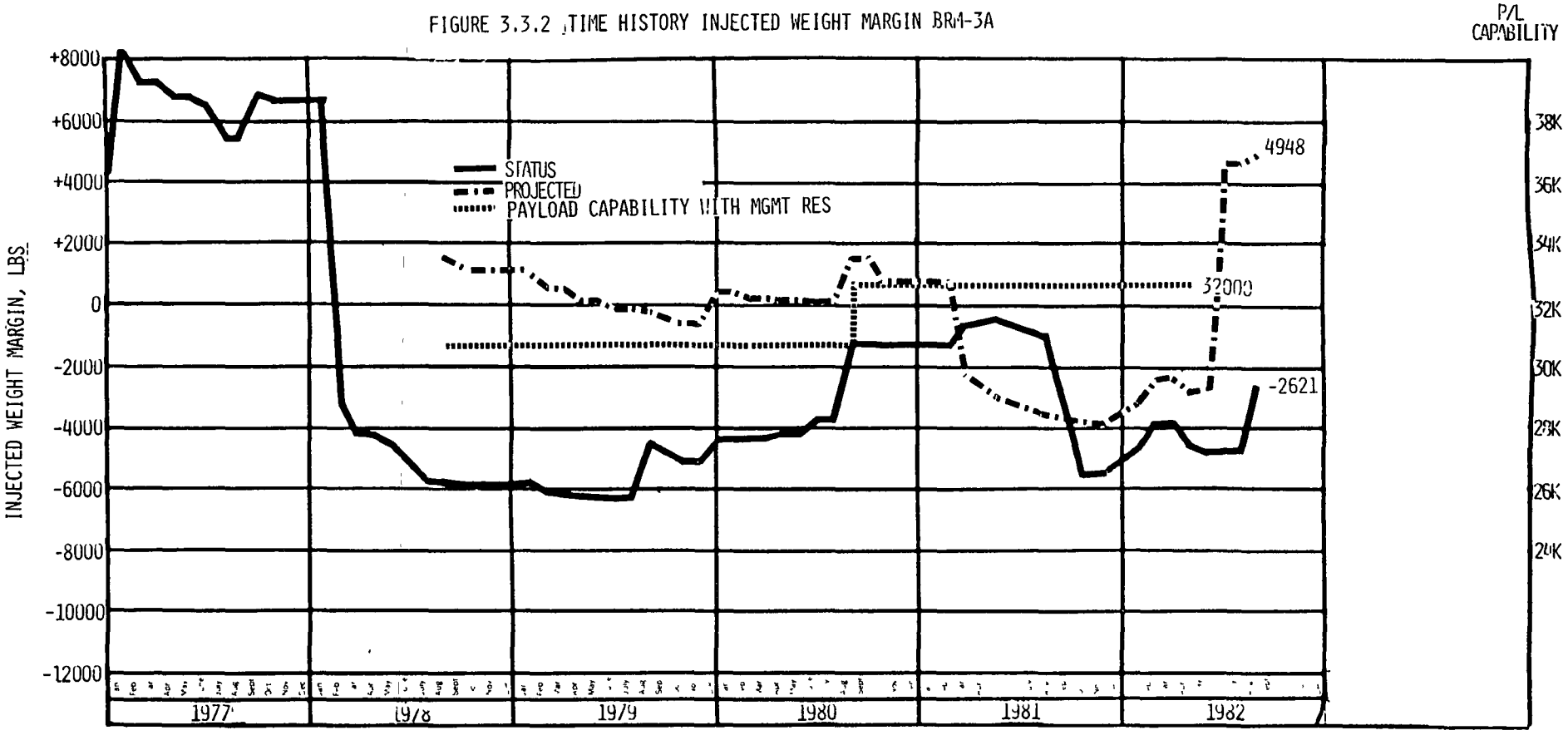


FIGURE 3.3.3 TIME HISTORY INJECTED WEIGHT MARGIN BRM-4

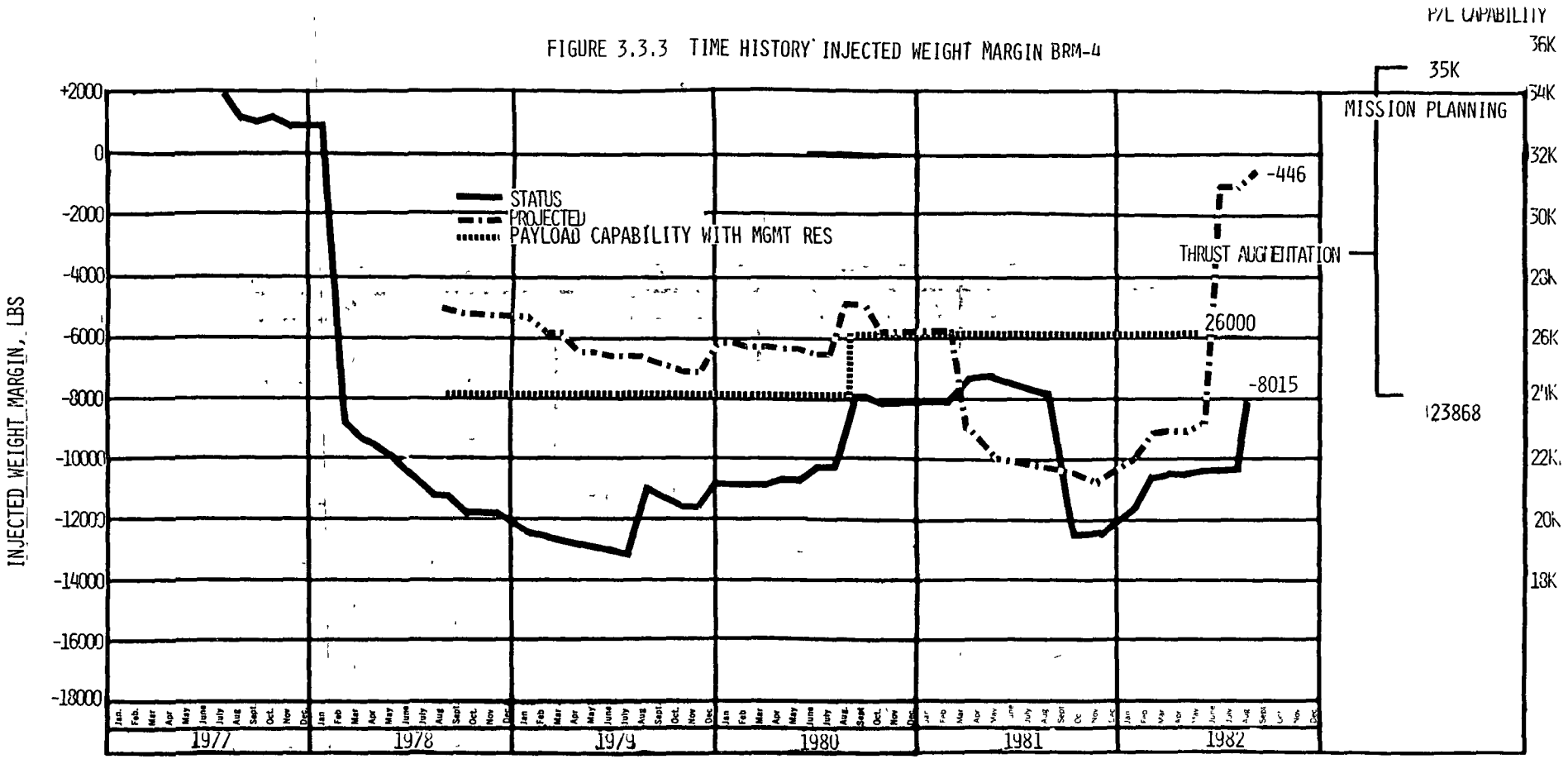


TABLE 3.7.1 - MANAGEMENT RESERVE HISTORY - MISSION 1

		SYSTEM	ORBITER	PERSONNEL	SSME	ET LW-7	SRB	STS OPERATOR	MARGIN
STATUS (SEP 78)			144842	2644	20340	73088	366130		
POTENTIAL			736	115	225	-183	2808		
STATUS + POTENTIAL			145578	2759	20565	72905	368938		
WEIGHT SAVERS			-4757	0	0	-2000	-8600		
PROJECTED			140821	2759	20565	70905	360338		3000
LEVEL II APPROVED CHANGES									
SINCE SEPT. 1978		-952	+358	0	+12	+68	+91	0	
1/80	MPS PROPELLANT LOAD	+341							
7/80	COMPUTER UPDATE	+229							
	SVB IGNITION DELAY	-585							
9/80	WIRE ROUTE ET AFT HEAT		+ 2						
11/80	NON-PROPULSIVE CONSUM.	-40							
	REDESIGN P/L PATCH PANEL		+6						
	ORB/ET ATTACH HOLE PLUG		+9						
	ADD WIRING THRU T-0 UMBIL		-3						
	ADD ORB AFD RF WIRING		+2						
3/81	IN-FLIGHT SSME SHUTDOWN		+16						
	FOUR P/L FEEDS FROM ORB		+8						
	INCREASE P/L ATTACH HDW ALLOC		+225						
	REALLOCATE 3RD CRYO SET	+1608							
	ADD 3RD CRYO TK SET TO ORB		+735						
	NON PROP CONSUM (3 TK SET)	-873							
4/81	SSME CONTROL WEIGHT UPDATE				+1005				
8/81	LET CONTROL WT UPDATE					-500			
	SOFI ICE/FROST PROTECTION					+40			
9/81	APU FUEL PUMP H_2O COOL		+ 98						
11/81	FAMOS		+ 35		+18				
	FUEL CELL ENHANCEMENT		+ 203						
2/82	STABILIZER TUBES IN CARGO BAY		+ 2						
	ANTI-SLAM FILL & DRAIN LINE		+ 2						
	AIRLOCK ISOLATION VALVE		- 3						
3/82	MPS UPDATE	-85							
4/82	SLOSH BAFFEL REMOVAL					-550			
	UPDATE LT. WT. DESIGN					-50			
	LH_2 SENSOR					-3			
	SRB UPDATE						+222		
6/82	MPS UPDATE	+18							
		-339	+1695	0	+1035	-995	+313	0	613
GROWTH TO SEPTEMBER 82		-17	+4733	+855	-723	-2538	+862		
PROJECTED			147249	3614	20877	67372	373086	0	-2593

TABLE 3.7.2 - MANAGEMENT RESERVE HISTORY - MISSION 3A

		SYSTEM	ORBITER	PERSONNEL	SSME	ET LWT-7	SRB	STS OPERATOR	MARGIN
STATUS (SEP 78)			144842	1465	20340	73088	366130		
POTENTIAL			736	38	225	-183	2808	0	
STATUS + POTENTIAL			145578	1503	20565	72905	368938		
WEIGHT SAVERS			-4757	0	0	-2000	-8600	0	
PROJECTED			140821	1503	20565	70905	360338	291	3000
LEVEL II APPROVED CHANGES									
SINCE SEPT. 1978		-929	+358	0	+12	+68	+91	0	
1/80	MPS PROPELLANT LOAD	+340							
7/80	COMPUTER UPDATE	+304							
	SVB IGNITION DELAY	-570							
9/80	WIRE ROUTE ET AFT HEAT		+ 2						
11/80	NON-PROPULSIVE CONSUM	-40							
	REDESIGN P/L PATCH PANEL		+ 6						
	ORB/ET AFT ATTACH HOLE PLUG		+ 9						
	ADD WIRING THRU T-0 UMBIL		- 3						
	ADD ORB AFD RF WIRING		+ 2						
3/81	IN-FLIGHT SSME SHUTDOWN		+16						
	FOUR P/L FEEDS FROM ORB		+ 8						
	INCREASE P/L ATTACH HDW ALLOC		+225						
	REALLOCATE 3RD CRYO TK SET	+291							
	ADD 3RD TK SET TO ORB		+291						
4/81	SSME CONTROL WEIGHT UPDATE				+1005				
8/81	LET CONTROL WT UPDATE					-500			
	SOFI ICE/FROST PROTECTION					+40			
9/81	APU FUEL PUMP H_2O COOL		+ 98						
11/81	FAMOS		+ 35		+18				
	FUEL CELL ENHANCEMENT		+203						
2/82	STABILIZER TUBES IN CARGO BAY		+ 2						
	ANTI-SLAM FILL & DRAINLINE		+ 2						
	AIRLOCK ISOLATION VALVE		- 3						
3/82	MPS UPDATE	-120							
4/82	SLOSH BAFFEL REMOVAL					-550			
	UPDATE LT. WT. DESIGN					-50			
	LH_2 SENSOR					-3			
	SRB UPDATE						+222		
5/82	RCS UPDATE TO FULL	-1271							
6/82	MPS UPDATE	+18							
		-1977	+1251	0	+1035	-995	+313		-581
GROWTH TO SEPTEMBER 82		+454	+4658	+958	-723	-2538	+862		
			146730	2461	20877	67372	373086	0	-3344

TABLE 3.7.2 - MANAGEMENT RESERVE HISTORY - MISSION 4

		SYSTEM	ORBITER	PERSONNEL	SSME	ET LWT-7	SRB	STS OPERATOR	MARGIN
STATUS (SEP 78)			144842	2644	20340	73088	366130	0	
POTENTIAL			736	115	225	-183	2808		
STATUS + POTENTIAL			145578	2759	20565	72905	368938		
WEIGHT SAVERS			-4757	0	0	-2000	-8600		
PROJECTED			140821	2759	20565	70905	360338	0	3000
LEVEL II APPROVED CHANGES									
SINCE SEPT. 1978		-949	+358	0	+12	+68	+91	0	
1/80	MPS PROPELLANT LOAD	+340							
7/80	COMPUTER UPDATE	+272							
	SVB IGNITION DELAY	-625							
9/80	WIRE ROUTE ET AFT HEAT		+ 2						
11/80	NON-PROPULSIVE CONSUM	-40							
	REDESIGN P/L PATCH PANEL		+ 6						
	ORB/ET AFT ATTACH HOLE PLUG		+ 9						
	ADD WIRING THRU T-0 UMBIL		- 3						
	ADD ORB AFD RF WIRING		+ 2						
3/81	IN-FLIGHT SSME SHUTDOWN		+16						
	FOUR P/L FEEDS FROM ORB		+ 8						
	INCREASE P/L ATTACH HDW ALLOC		+225						
	REALLOCATE 3RD CRYO TK SET	+1608							
	ADD 3RD TK SET TO ORB		+735						
	NON-PROP CONSUM (3 TK SET)	-873							
4/81	SSME CONTROL WEIGHT UPDATE				+1005				
8/81	LET CONTROL WT UPDATE					-500			
	SOFI ICE/FROST PROTECTION					+40			
9/81	APU FUEL PUMP H_2O COOL		+ 98						
11/81	FAMOS		+ 35		+18				
	FUEL CELL ENHANCEMENT		+203						
2/82	STABILIZER TUBES IN CARGO BAY		+ 2						
	ANTI-SLAM FILL & DRAINLINE		+ 2						
	AIRLOCK ISOLATION VALVE		- 3						
3/82	MPS UPDATE	-120							
4/82	SLOSH BAFFEL REMOVAL					-550			
	UPDATE LT. WT. DESIGN					-50			
	LH_2 SENSOR					-3			
6/82	MPS UPDATE	+18							
		-369	+1695	0	+1035	-995	+331		583
GROWTH TO SEPTEMBER 82		-132	+4733	+855	-723	-2538	+862		
PROJECTED			147249	3614	20877	67372	373086	0	-2738

TABLE 3.8.1 - ORBITER/SSME CONTROL WEIGHT ARITHMETIC

September 1974	
Orbiter Inert Control Weight, lb	132139
Orbiter Closed Loop Fluids, lb	-1369
Orbiter Dry, lb	130770
Personnel Allocation From Orbiter, lb	+225
SSMEX3, lb	+19017
Total Dry, lb	150012*

*SSME3 Control Weight Increased 12 lb Per PRCBD S00780: 6-18-74

July 1982 - September 1982	Mission 1	Mission 3A
Orbiter Inert Control Weight, lb	142483	142039
Changes		
No change this report		
New Orbiter Inert Control, lb	142483	142039
Closed Loop Fluids, lb	-1598	-1598
Orbiter Dry, lb	140884	140440
Personnel Allocation From Orbiter, lb	+277	+277
SSMEX3, lb	+20997	+20997
FASCOS	18	18
Total Dry, lb	162176	161732
Transferred From Level II - Management Reserve, lb	-12176	-11732
Orbiter Dry Weight, lb	150000	150000

TABLE 3.8.2 - ET CONTROL WEIGHT ARITHMETIC

September 1974	
ET Inert Control - Level III	70910
ET Inert - CFE	(70387)
ET/Orbiter Umbilical Hdw-GFE	(523)
Separation - GFE	380
SRB Supports - GFE	(375)
Orbiter Ftg - GFE	(5)
ET Inert Control - Level II	71290
Residuals - Nominal	3710
ET at MECO	75000

July 1982 - September 1982	LWT
ET Inert - CFE	68644
Changes	
None this Report	
New ET Inert CFE	68644
ET/Orb Unbilical - GFE	+474
ET Inert Control Level III	69118
Separation - GFE	809
SRB Supports - GFE	(750)
ORB Ftgs - GFE (EO-1. 2. & 3)	(59)
New ET Inert Control Level II	69927
Residuals - AOA	8231
- Non Prop Gas	423
Total at MECO	78581
Transferred from Level II Mgmt. Reserve	-3581
ET at MECO	75000

TABLE 3.8.3 - SRB CONTROL WEIGHT ARITHMETIC

SRM PDR November 1974		July 1982 - September 1982	Hvy. Wt.	Lt. Wt.	Lt.-HPM	Hvy. Wt. - HPM
SRBX2 Inert Control	361020	SRBX2 Inert Control	372522	365822	369000	375600
		Changes				
		None this Report				
		New SRBX2 Inert	372522	365822	369000	375600
		Transferred from Level II Mgmt Reserve -	-11502	-4802	-7980	-14580
		SRBX2 Inert	361020	361020	361020	361020

TABLE 3.11 - BASELINE CAPABILITY VARIATIONS LISTS - BRM'S & PRM'S

TITLE	MARGIN IMPACT (LBS)	ACTIONEE
Delete SSME-TVC Force Limiters	+30	RIRD/MSFC
SSME Insulation	+ 42	ES/MSFC-SSME/
SSME Interstage Seal	+1675	MSFC-SSME/
MADS Scar (OV-102)	-453	RI-Orbiter
(OV-099)	-235	
Non-propulsive Consumables	-926	MPAD
Personnel Weight Growth	-855	LA3
Orbiter Weight Savers (OV-103)	+ 854	JSC-Orbiter
(OV-104)	+1772	
WTR Motor at ETR	+2000	MSFC-SRB
Deletion of SRB ignition delay	+585	
Delete SRB Recovery System	+1259	
$2\sigma/1\sigma$ FPR at Mode Boundary	+1785	JSC-SSPO
Reduced FPR for MPS Loading	+530	RI-SSG
Delete Range Safety Systems	+431	Level I
Performance Enhancement Studies	+5500	Level I
MPS Optimized FB and DB	+509	Level II
MPS Ullage Pressure	+250	Level II
Shape Nominal (TAL)	+3000	

BRIEF DESCRIPTION OF BASELINE CAPABILITY VARIATIONS LIST

DELETE SSME-TVC FORCE LIMITERS + 30

The original design of the SSME/TVC actuators was limited to 3.21M in-lbs. This design required incorporation of a force limiter. Rocketdyne analysis of the TVC side loads during engine start indicates the engine gimbal hinge moments are 1.8M in-lbs. Therefore, the force limiter could be eliminated. This would result in a 5-lb weight decrease per actuator or 30 lbs per vehicle with a corresponding increase to the injected weight margin.

SSME NOZZLE INSULATION +42

If the thermal environment is less than projected, the insulation and secondary structure might be removed. The total potential increase to the injected weight margin is 42 lbs.

REDESIGN OF SSME LOX INTERMEDIATE SEAL +1675

The SSME contractor is currently conducting a design study to reduce the helium flow required as a pressure barrier between the HPOTP LOX and the hot gases of the turbine drive. The incorporation of the SSME seal purge resulted in a 1675 lb increase. This should be the target for the weight reduction study.

BRIEF DESCRIPTION OF BASELINE CAPABILITY VARIATIONS LIST (CONT)

MADS SCAR -453/-235

The Modular Auxiliary Data System (MADS) was designed to meet the basic requirements of OEX, payloads, Air Force and OFT testing. The current MADS scar weight is 1347 lbs on OV-102 and could be increased 453 lbs. The scar weight is 235 lbs. on OV-099.

BRIEF DESCRIPTION OF BASELINE CAPABILITY VARIATIONS LISTS (CONT)

NON-PROPULSIVE CONSUMABLES -926

Potable Water (-241)

The current load for operational missions will support either an AOA or a nominal mission; however, if abort from orbit capability is required, the potable water load which supports equipment cooling must be increased. This increase is predicated on flight procedures defined for STS-1.

Waste Water (-314)

Same as potable water.

APU N_2H_2 (-300)

The current load for operational missions is 702 lbs. Using STS-1 procedures such as pre-deorbit maneuver APU startup and APU's on continuously for AOA, full APU systems are required.

HYDRAULIC WATER (-71)

The current load for operational missions is 353 lbs. Assuming STS-1 philosophy, the load could be increased to full.

PERSONNEL WEIGHT GROWTH +855

The personnel status weight has been higher than the control weight for a considerable length of time. If a personnel scrub does not occur, a penalty of 855 lbs for baseline reference missions will result.

ORBITER WEIGHT SAVERS +854/+1172

A new list of potential weight savers is being carried by the Orbiter Project Office. These items could increase performance capability by 854 lbs and 1172 lbs for OV-103 and OV-104 respectively.

WTR MOTOR AT ETR +2000

The WTR Motor defined as 86-80 or HPM can be used at ETR December through March. This results in a payload improvement of approximately 2000 lbs. The use of this motor is dependent upon a 14-month lead time for production.

SVB IGNITION DELAY +585

A 2.75 sec SRB ignition delay was incorporated into the launch procedure to minimize the base bending moment at liftoff due to the ignition of the SSME's (TWANG). If data from OFT indicates the TWANG is less than projected the deletion of the time delay would regain 585 lbs in performance for BRM-1. BRM 3A performance gain is 570 and BRM-4 gain is 625 lbs.

DELETE SRB RECOVERY SYSTEM +1259

The present program groundrule requires that the SRB's be recovered and refurbished for future use to minimize the cost per flight. To increase the injected weight capability for selected flights, the booster recovery system could be deleted for an increase in the injected weight margin of 1259 lbs per mission. The systems that wouldbe deleted are the pilot parachute assembly, drogue parachute assembly, main parachute assembly, frustrum flotation, altitude switch, water impact, SRB location aids, frustum location aids, towing pendant, and ordinance items with a resultant weight savings of 1259 lbs. This performance improvement option can be incorporated at any time during the operational phases of the Space Shuttle Program without impacting hardware of software requirements.

2∂/1∂ FPR AT MODE BOUNDARY +1785

The current OFT groundrules for STS 3 and 4 utilize a 1σ dispersion in the FPR for AOA. If the current 2σ used for operational AOA is decreased to 1σ, the corresponding gain in performance is 1785 lbs.

REDUCED FLIGHT PERFORMANCE RESERVE FOR MPS LOADING +530

The flight performance reserve defined for ET loading accuracy is ±0.54 percent for the liquid oxygen and ±0.69 percent for the liquid hydrogen, when considering the combined errors within the ET, Orbiter and ground control. The current flight performance reserve is based upon the best estimate for the ET and a combined factor for the remaining terms of Orbiter and ground control. MCR 899 documented the modeling of the loading system to determine component inaccuracies and accuracy was as follows:

	Liquid Oxygen	Liquid Hydrogen
External Tank Accuracy, percent	0.46	0.53
Boiloff Variation, percent	0.0004	0.046
Orbiter Variation, percent	0.002	--
Ground Control Variation, percent	0.003	0.005
RSS	0.46	0.53

This model shows the liquid oxygen loading accuracy increases 0.08 percent and the liquid hydrogen accuracy increases 0.16 percent, both of which will result in a 330-lb performance increase. The incorporation of a capacitance probe for MPTA (PCIN S01615) will further decrease loading errors and has a potential increase of 200 lb performance for a total increase of 530 lbs to the injected weight margin.

DELETION OF RANGE SAFETY SYSTEM (RSS) +431

The potential manifest reduction list (Table 8.1) reflects the weight reduction to be achieved for a particular mission, by the deletion of an already incorporated RSS. This weight reduction is 367 lbs (Orbiter 37, ET 283, SRB 47). If the RSS requirement is deleted prior to fabrication, the injected weight margin would be increased 431 lbs (Orbiter 41, ET 343, SRB 47).

SRB FILAMENT WOUND CASE +5500

Filament wound (Composite) SRM Case

MPS OPTIMIZED FUEL BIAS AND DRAINBACK

If the BRM MPS is maximized for optimum fuel bias and drainback by loading to 12 inches below the LH_2 diffusers (X > 1051) and 18 inches below the LOX diffuser (X > 420). The constraining sensor is LH_2 and the sensors would be located as follows:

MPS Budget	From V	To V4
Lox X in	441.8	423.7
LH_2 X in	1063.	1051.

BRIEF DESCRIPTION OF BASELINE CAPABILITY VARIATIONS LIST (CONTINUED)

It is to be noted the fuel bias is tweaked for optimum (fb = 1150 versus 1100) for V4 the performance gain of V4 vs. V is 307 lbs.

MPS ULLAGE PRESSURE

If the ullage pressure is not 0.3 and 0.3psi but 0.3 and 2.4 psi (ullage for LH_2 and Lox) the critical sensor is the Lox. The locations would be as follows

MPS Budget	From V	To V5
Lox X in	441.8	420.0
LH_2 X in	1063.	1057.8

The performance gain is 144 lbs.

SHAPE NOMINAL

If TAL is approved for BRM'S the ascent trajectory can be shaped nominal for an approximate 3000 lb performance gain.

4.0 ORBITER WEIGHT SUMMARY

This section provides the inert weight status along with pending changes, a comparison of STS to the Operational OV-102, post STS-5 KSC rework and a time history of Orbiter inert weight. The inert weight data was taken from SD72-SH-0120-116, "Space Shuttle Mass Properties Status," dated September 2, 1982. The non-propulsive consumables are based on the control weights specified in JSC-07700, Volume X, Appendix 10.12.

TABLE 4.1 - ORBITER INERT WEIGHT CHANGES - STATUS 09-17-82

SEQ NO (MCR NO)	ITEM	STS-005 OV-102	STS-006 OV-099	STS-007 OV-099	STS-008 OV-099	STS-009 OV-102	STS-010 OV-099	STS-011 OV-102	STS-012 OV-103	STS-013 OV-099
	RI-SPACE DIV PREV INERT STATUS 07-02-82	151858	149600	149903	149903	149858	150067	153009	147992	150104
8/9-24	*TAIL-AL HONEYCOMB FIN L/E								-44	
82/5-4	* TPS-REP ABLATOR WITH TILE	-85				-85		-85		
82/6-3	* EMU-TV SYS CAPABILITY	3				3		3	3	
82/7-3	* TPS-TILE DENSIFY PLAN	95				95		95		
82/8-1	* TPS-DES CHGS FLT TEST	1				1		1		
82/8-3	* OPER + RESCUE SEAT STRUT	16				16	16	16	16	
	TOTAL RI NEW CHANGES	30				30	16	30	-25	
	RI-SPACE DIV RPT INERT STATUS 09-02-82	151888	149600	149903	149903	149888	150083	153039	147967	150104
	CHANGES NOT INCORPORATED									
	* CHANGE FROM FLT 5 TO 4-OV099						-209			
	* CHANGE TO OV-102 FROM OV099					2000				
	* CHANGE FROM 102 OPER TO 102E							1725		
	* MOD FOR STS-9					2876				
	* ADD ARM RESTS TO SEATS(S21694)		18	18	18	18	18	18	18	
	BOUYANCY	80	80	80	80	80	80	80	80	80
	TOTAL SSPO RPT CHANGES	30	18	18	18	4924	-175	1773	-7	
	SSPO RPT INERT STATUS	151968	149698	150001	150001	154862	149972	154862	148065	150184

* NEW CHANGE THIS REPORT.

TABLE 4.2 OV-102,OV-099 AND OV-103 ---INERT WEIGHT COMPARISON-STATUS

MISSION	STS-05	STS-09	STS-11	OPER	STS-06	STS-07	STS-08	STS-10	STS-13	OPER
ORBITER	OV-102E	OV-102E	OV-102E	OV-102	OV-099	OV-099	OV-099	OV-099	OV-099	OV-099
STATUS	151888	151888	151888	151888	149618	149618	149618	149618	149618	149618
DEL FASCOS,ADD FAMOS		13	13	13						
SW BEAM ANT+WIRE TO-1307(8+7)		15	15	15						
ADD WIRING FOR SMCH		5	5	5						
ADD TIMING BUFFER				11						
ADD 4 P/L FEED FROM ORB		10	10	10						
ADD ORBITER AFD RF WIRING		2	2	2						
COMMAND AUTH.		1	1	1						
2 FLIGHT DECK SEATS-OPER.		202	202	202						
DFI SCAR		1800	1800	460						
COMSEC		41	41	41						
ADD GALLEY		164	164	164						
DELETE H2O DISPENSER		-21	-21	-21						
RENDZ RADAR (KU BAND)		359	359	359						
HARD COPIER		100	100	100						
INSIDE AIRLOCK/TUNNEL ADTL CAP		5	5	5						
ACTIVE PAYLOAD RETENTION MECH				6						
VERT LCD INDICATOR				-2						
DELETE COMM B SCAR				-43						
REMOVE MID DECK CLOSEOUT PNLS		-10	-10	-30						
MPS PREVALVE SLAM PREVENTION				32						
ELBOW CAM. KIT+RMS DFI UPDAT				-42						
NEW MEAS TO ORBITER OI				91						
REMOVE ALT EMU LCG H2O LINE				-15						
PGHM ATTACH POINTS				2						
CABIN+AVION FAN DELTA P XDUCER				3						
WATER PUMP PKG-DELTA P XDUCER				2						
REV CREW STA CAMERA MTS				2						
REDESIGN P/L PATCH PANEL				6						
REDESIGN LDG ISO+MPS SHUT VLV				-22						
INCR STR STAB TUBE P/L				2						
ADD OFI FOR INCREMENT APU				1						
KSC REWORK				-1126						
INCR. WING TRUSS TUBES				8						
CHANGE EFF OF OVHED FLDLITES				7						
CHANGE CLAMPS FOR PVD DUCTS				-8						
HYD SYS DRAIN PORTS+GAS WIRING				9						
P/L SINGLE LATCH CONTROL				6						
MID FUSE MOD-THERMAL STRESS				-75						
ESCAPE APRON				2						
ADD KU BAND ANTENNA ROTATION				2						
GLOBAL POSITIONING SYSTEM				47						
ADD GPS 3 + 4 STRING PROV				9						
REMOVE DECOMP CONVERS+IMU MUF				-21						
HEADS UP DISPLAY				191						
5.4 LOADS ASSESSMENT				526						
TPS DESIGN PRODUCIBILITY				11						
TVC SERVO ACTUATOR LT. WT.				-62						
FRCS TANK SWIRL DIFFUSER				8						
OMS PROP TK PRESS LINE SUPT.				4						
ANTI-SLAM FILL + DRAIN VALVE				-4				2	2	2
F/C H2 PUMP DESIGN IMPROVEMENT				6					6	6
RMS MEASUREMENT TO OI				7						7
DEL SRB FIRE COMM CKT MOD								-2	-2	-2
3 SUB-STACK,FUEL CELLS		203	203	203					203	203
INCR III MCA OPTIMIZATION		5	5	5		5	5	5	5	5
RENDEZVOUS RADAR						298	298	298	298	298
FAMOS DELTA								-45	-45	-45
EMU-TV SYS. CAPABILITY									3	3
OPER + RESCUE SEAT STRUT ATT.								16	16	16
INERT	151888	154782	154782	153003	149618	149921	149923	149892	150104	150111

TABLE 4.3 - OV-102 OPERATIONAL REWORK

Remove Ejection Seats and Rail	-664
Add Operational Seats	318
Add Emergency Egress Provision Through Right-hand Observation Window	88
Remove Emergency Escape Hatch and Provision	(-929)
Redesign CM/FF Escape Panel and Provision	-214
Ejection Panel Support Structure, Baffles & TCS	- 52
Seat Rail Support Beam and Fitting	- 52
Support Struts to Mid-Deck Floor	- 44
Seat Torque Box	-182
Pyrotechnic System	-385
Remove Escape Suit Ventilation System Kit	- 14
Ejection Seat Removal Mod	-1201
Add Multiple Attached Payloads	5
Remove C-Band Antenna Switch (OFT Only)	- 5
Add Keel Mounted TV	57
Add C-Band Antenna for Operational	3
Change OFT Egress to Operational Egress	8
Single Zeroize Switch	1
FCP & Power Contractor Redundant Control Power	2
EMU Incompat With Airlock Power Supply/Battery Charger	4
ORBITER INERT TOTAL	-1126

TABLE 4.4 - ORBITER POTENTIAL INERT WEIGHT CHANGES

SEQ. NO. (MCR NO)	ITEM	STS-5/OV-102E WEIGHT, LB	STS-9&11/OV102E WEIGHT, LB	OV-102 OPER WEIGHT, LB	OV-099 WEIGHT, LB	OV-099 OPER WEIGHT, LB	OV-103 WEIGHT, LB
			30	1360	-65	-65	-807
8/3-13	Remove Mech. MLG Ext. Boosters						-32
8/4-4	Payload Bay Door Deflection				+5	+5	+5
8/5-4	Remove Heat Sink				-50	-50	-50
8/5-10	TPS Update						-870
8/5-14	Delete SSME TV Actuator Force Limiter		-20	-20	-20	-20	-20
80/12-3	RCS PROP TNK Config. Diaphram						TBD
80/5-3	OMS Pod GR/EP Skin Panel Moisture Prot						+160
81/7-2	Residual DFI Wiring			1330			
82/7-3	Densification of remaining Tile		+50	50			
	Weight Reduction Candidates		0	-1212(1)	0	0	-9
	STATUS WEIGHT	151968	154862	153083	149698	150191	148065
	Projected Inert Changes	--	30	1360	-65	-65	-816
	PROJECTED WEIGHT	151968	154892	154443	149633	150126	147249

(1) CANCELLED - Hold for Future Consideration.

FIGURE 4.1 ORBITER -102 INERT WEIGHT HISTORY

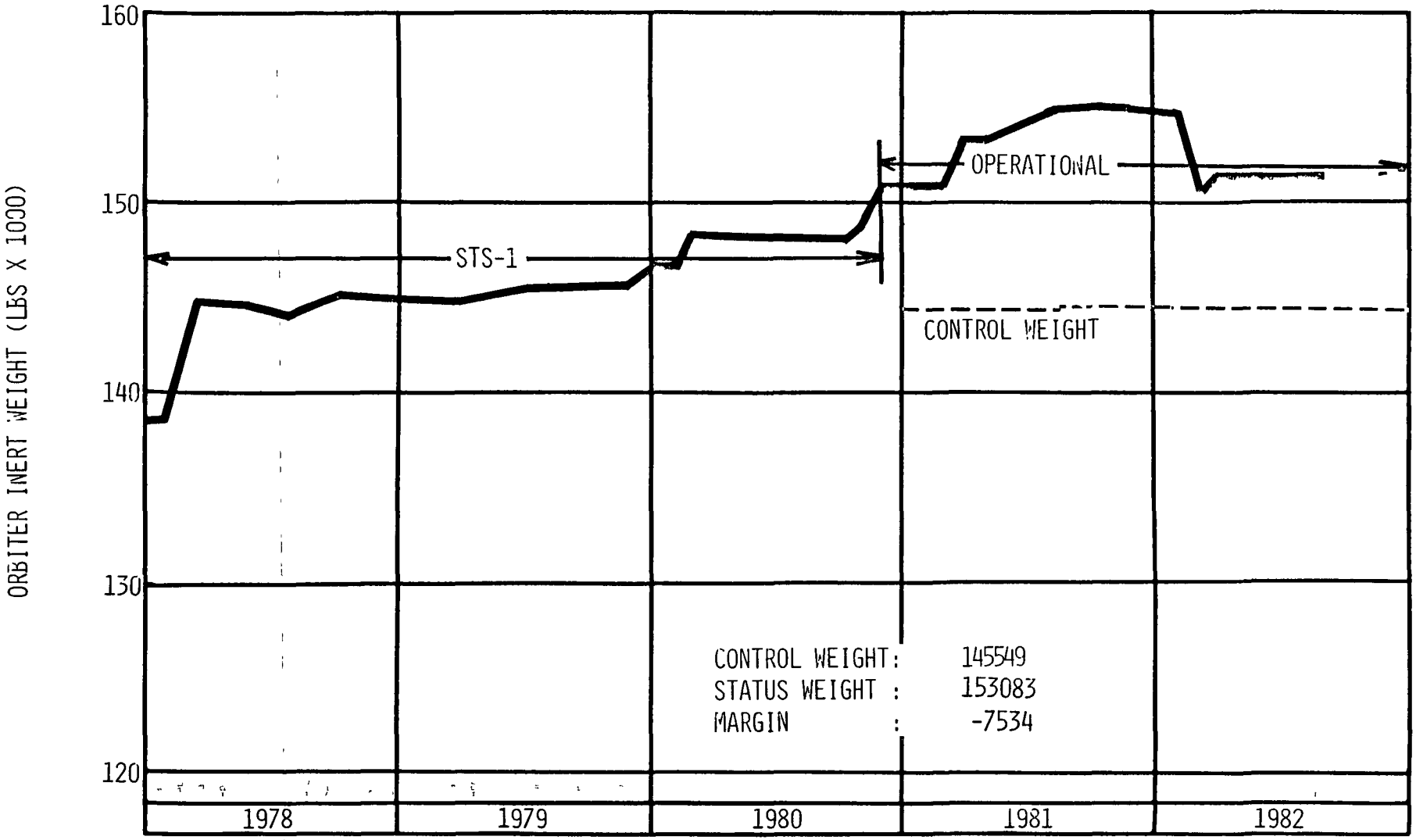


FIGURE 4.2 ORBITER -099 INERT WEIGHT HISTORY

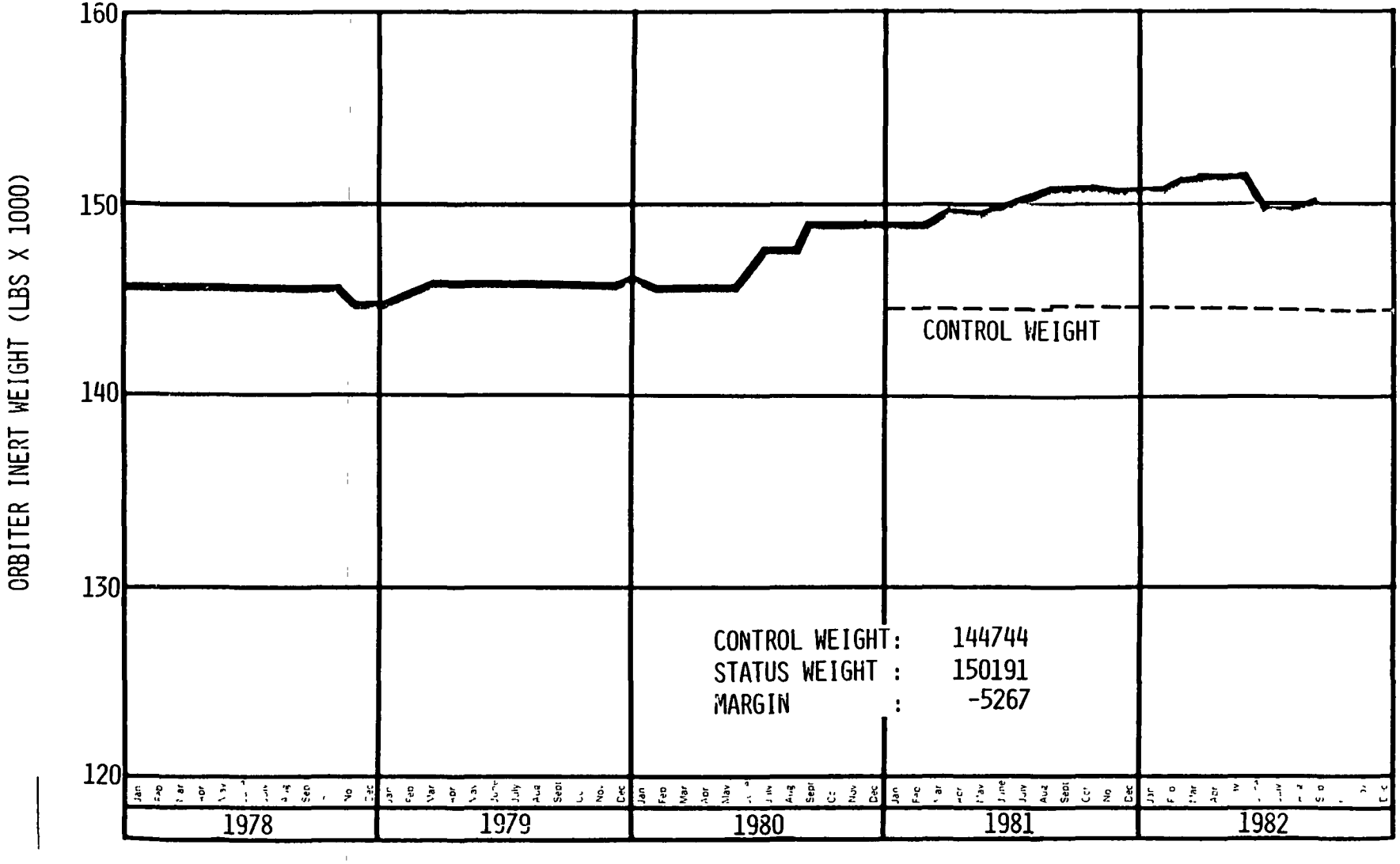


FIGURE 4.3 ORBITER -103 INERT WEIGHT HISTORY

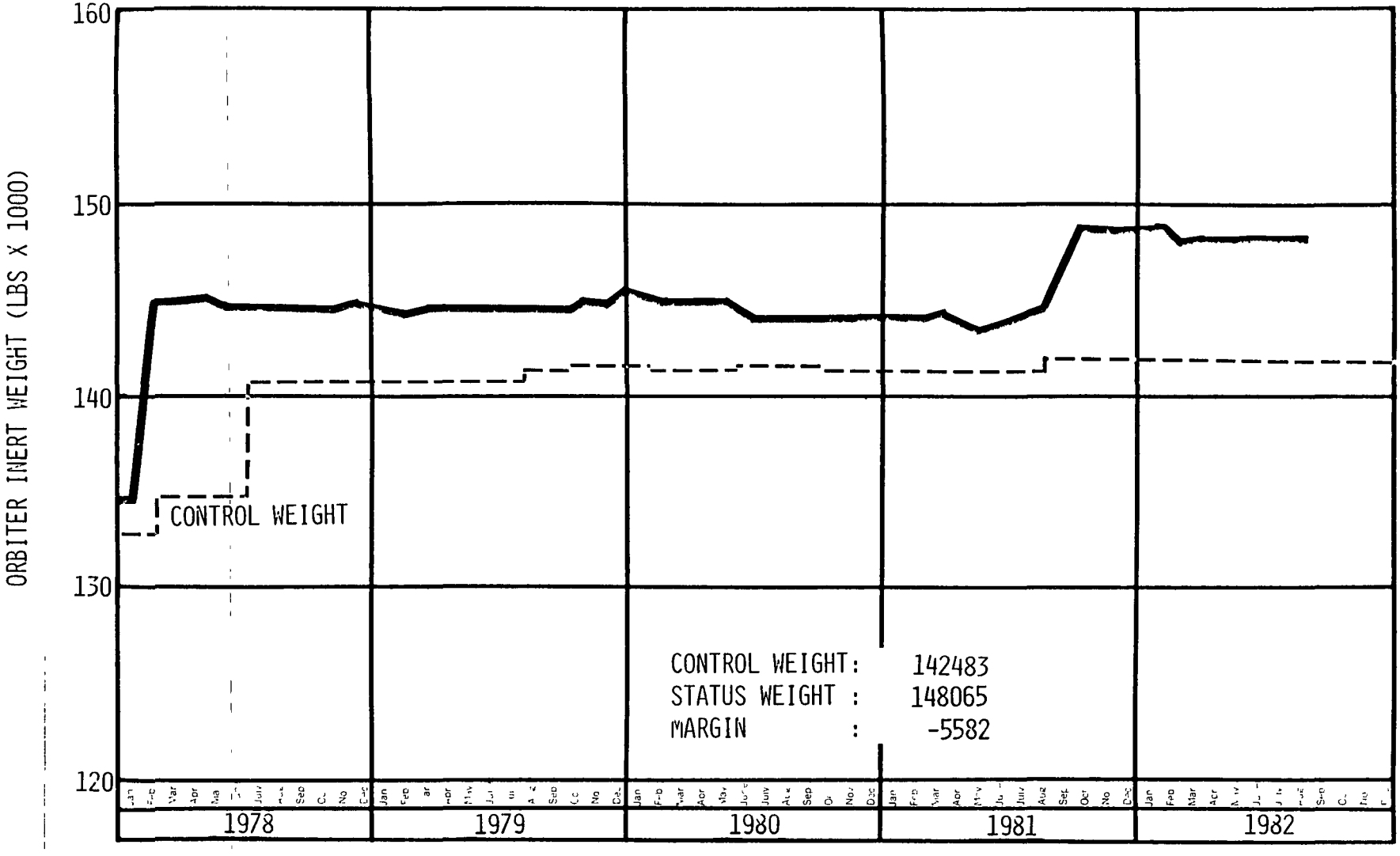


TABLE 4.6 - ORBITER PROPELLANT AND NON-PROPULSIVE CONSUMABLES FLUID CHANGES - STATUS 09-17-82

ITEM	STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
PREV RPTED NON-PROP CONSUMABLES	5503	5487	5456	5634	5358	5409	5409	5418	
* POTABLE WATER				-148					
* WASTE WATER	-31			-30					
* CRYO					873				
* APU N2H4 LOAD	3	9	9	9	3	3	9		
* APU H2O-FUEL PUMP COOL	-10								
* AUX O2					44	44			
TOTAL SSPO RPTED CHANGES	-38	9	9	-169	920	47	9		
SSPO RPTED NON-PROP CONSUMABLES	5465	5496	5465	5465	6278	5456	5418	5418	
PREV RPTED OMS PROPELLANT	19100	19300	21000	22100	15500	19500	21100	25064	
* OMS PROPELLANT CHANGES	700		-500	-1800					
SSPO RPTED OMS PROPELLANT	19800	19300	20500	20300	15500	19500	21100	25064	
PREV RPTED RCS PROPELLANT	7888	7508	7508	7508	7508	7888	7508	7416	
* RCS PROPELLANT CHANGES		-92	-92	-92	380				
SSPO RPTED RCS PROPELLANT	7888	7416	7416	7416	7888	7888	7508	7416	

* NEW CHANGE THIS REPORT.

TABLE 4.7 - ORBITER PROPELLANT AND NON-PROPULSIVE CONSUMABLES FLUID LOADINGS SUMMARY AT SRB IGNITION

Mission	STS-5	STS-6	STS-7	STS-8
Vehicle	OV-102E	OV-099	OV-099	OV-099
Propellant-Main Ascent Total	---SEE SECTION 9---			
Propellant - OMS Load	19800	19300	20500	20300
Insertion	10145	10222	10357	9718
On Orbit	2352	1223	2573	2458
De Orbit	5387	6053	5814	6225
Dispersions & Contingency	1025	1003	957	1100
Residuals	891	799	799	799
Ballast (R Pod/L Pod)	0/0	0/0	0/0	0/0
Propellant - RCS Fwd	2464	2446	2446	2446
Usable	1807	1952	1893	1893
Dispersions and Contingency	265	212	271	271
Residuals	392	282	282	282
RCS Dump (X CG)	Yes(1)	Yes(1)	Yes(1)	Yes(1)
Propellant - RCS Aft	5424	4970	4970	4970
Usable	1967	1812	1860	1929
Dispersion & Contingency	619	580	642	463
Residuals	748	378	378	378
Entry Allowance	2090	2200	2090	2200
Non-Propulsive Consumables	5465	5496	5465	5465
N_2 Gaseous-Launch Load	262	262	262	262
Water-Potable Launch Load	440	440	440	440
Water-Waste Load	22	81	50	50
NH_3-Launch Load	98	98	98	98
O_2 Cryogenic-Load (Tank sets)	2343(3)	2343(3)	2343(3)	2343(3)
H_2 Cryogenic-Load (Tank sets)	276(3)	276(3)	276(3)	276(3)
APU N_2H_4-Load	999	1005	1005	1005
Hydraulic Water-Launch Load	424	424	424	424
APU H_2O-Gas Gen. Cool	6	6	6	6
APU H_2O-Fuel Pump Cool	32	42	42	42
Auxiliary O_2	44	0	0	0
Cabin Air	174	174	174	174
MPS Pressurants	43	43	43	43
OMS Pressurants	114	114	114	114
RCS Pressurants	28	28	28	28
Water Pressurants	1	1	1	1
NH_3 Pressurants	0	0	0	0
APU Pressurants	6	6	6	6
SSME Shutdown & Seal Purge (He)	151	151	151	151
ECLSS Pressurant (GN_2)	2	2	2	2

(1) AS REQUIRED FOR X CG CONTROL

TABLE 4.7 - ORBITER PROPELLANT AND NON-PROPULSIVE CONSUMABLES FLUID LOADINGS SUMMARY AT SRB IGNITION (CONTINUED)

Mission	STS-9	STS-11	STS-12	STS-13	1 Due East	3A Deploy	4 Perform Cap. Asses
Vehicle	OV-102E	OV-102E	OV-103	OV-099	OV-103	OV-103	OV-103
Propellant-Main Ascent Total	SEE SECTION 9						
Propellant - OMS Load	15500	19500	21100	25064	19700	15095	25064
Insertion	7749	TBD	TBD	TBD	5462	9209	12083
On Orbit		TBD	TBD	TBD	6107	774	4726
De Orbit	5697	TBD	TBD	TBD	6523	3638	6132
Dispersions & Contingency	1163	TBD	TBD	TBD	809	675	1324
Residuals	891	891	799	799	799	799	799
Ballast (R POD/L POD)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Propellant - RCS Fwd Load	2464	2464	2477	2446	2477	2477	2477
Usable	N/A	TBD	1960	TBD	1960	1960	1960
Dispersions & Contingency	N/A	TBD	260	TBD	260	260	260
Residuals	392	392	257	282	257	257	257
RCS Dump (X CG)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)	Yes(1)
Propellant - RCS Aft	5424	5424	5031	4970	5031	5031	5031
Usable	TBD	TBD	2908	TBD	2908	2908	2908
Dispersions & Contingency	N/A	TBD	643	TBD	643	643	643
Residuals	748	748	322	378	322	322	322
Entry Allowance	TBD	TBD	1158	TBD	1158	1158	1158
Non-Propulsive Consumables	6278*	5456	5418	5418	4749	3942	4749
N_2 Gaseous-Launch Load	262	262	262	262	212	212	212
Water-Potable Launch Load	389	440	440	440	185.0	185.0	185.0
Water-Waste Load	3	3	3	3	11.0	11.0	11.0
NH_3-Launch Load	98	98	98	98	97.6	97.6	97.6
O_2 Cryogenic-Load (Tank sets)	3124(4)*	2343(3)	2343(3)	2343(3)	2334.0(3)	1552.5(2)	2334.0(3)
H_2 Cryogenic-Load (Tank sets)	368(4)*	276(3)	276(3)	276(3)	274.3(3)	182.8(2)	274.3(3)
APU N_2H_4-Load	999	999	1005	1005	702.0	702.0	702.0
Hydraulic Water-Launch Load	424	424	424	424	353.0	353.0	353.0
APU H_2O-Gas Gen. Cool	6	6	6	6	6.0	6.0	6.0
APU H_2O-Fuel Pump Cool	42	42	42	42	42.0	42.0	42.0
(2)Auxiliary O_2	44	44	0	0	0.0	66.0	0.0
Cabin Air	174	174	174	174	190.0	190.0	190.0
MPS Pressurants	43	43	43	43	44.0	44.0	44.0
OMS Pressurants	114	114	114	114	113.0	113.0	113.0
RCS Pressurants	28	28	28	28	28.0	28.0	28.0
Water Pressurants	1	1	1	1	1.0	1.0	1.0
NH_3 Pressurants	0	0	0	0	0.1	0.1	0.1
APU Pressurants	6	6	6	6	3.0	3.0	3.0
SSME Shutdown & Seal Purge (He)	151	151	151	151	152.0	152.0	152.0
ECLSS Pressurant (GN_2)	2	2	2	2	1.0	1.0	1.0

* Tank set 4 Cryos ARE Charged to P/L

(1) AS REQUIRED FOR X CG CONTROL.

(2) NOT REQUIRED WITH 3 OR MORE EPS TANK SETS, EXCEPT FOR OFT.

5.0 PERSONNEL AND FLIGHT CREW EQUIPMENT

This section presents the weight status and definition of Personnel Elements for BRM and STS Missions. A matrix of crew size versus mission duration for operational missions along with crew equipment changeout items necessary when manifesting is also presented.

TABLE 5.1 - CURRENT PERSONNEL AND FLIGHT CREW EQUIPMENT WEIGHT CHANGE SUMMARY - STATUS 09-17-82

	ITEM		STS-005	STS-006	STS-007	STS-008	STS-009	STS-010	STS-011	STS-012	STS-013
	PERSONNEL 07-30-82		3985	3614	3614	3614	3614		3614	3614	3614
	* DELETE 4M/7D REQ		-112								
	* DELETE TOOLS + EQUIP		-174								
	* ET SEP CAMERAS		34								
	* ADD PNLS		8								
<	TOTAL PERSONNEL AND GFE CHANGES		-244								
>	TOTAL PERSONNEL AND GFE (1)		3741	3614	3614	3614	3614		3614	3614	3614

* NEW CHANGE THIS REPORT.
(1) REFLECTS ADDITIONAL EQUIPMENT FOR 7 DAYS.

TABLE 5.2 - PERSONNEL AND FLIGHT CREW EQUIPMENT MATRIX - OPERATIONAL MISSIONS (1)(2)(3)

CONTROL WEIGHTS

Crewmembers \ Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	20	30
2	2709	274	2867		2925		2996									
3		3038	3150		3229		3372									
4		3318	3407	3545 (4)	3588	3658 (4)	3700									
5																
6							4626									
7																

STATUS WEIGHTS

Crewmembers \ Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	20	30
2	2629	2642	2781		2838		2909									
3		2948	3032		3142		3285									
4		3228	3321	3452	3501	3572	3614									
5																
6							4539									
7																

(1) This matrix should not be used for "Y" or BRM-3A 2 Crewmember/1 Day Missions.

(2) Based on JSC-17858, Standard Flight Crew Equipment for STS Operations.

(3) Weight include 2 day contingency.

(4) Not approved, under review.

TABLE 5.3.- FLIGHT CREW EQUIPMENT CHANGEOUT ITEMS - OPERATIONAL MISSIONS

Deletions		Additions		
Item	Wt/Item, lb	Item	Requirements	Wt/Item, lb
1. Galley (1)	164.0	Food tray	1/crewmember	2.0
		Food accessories	1/set/mission	3.8
		Food Warmer	1/mission	14.4
		Wet wipe disp. assy.	2/14 mandays	.4
		Water dispensing sys.	1/mission	23.0 (2)
		Locker volume	1+1 locker/14 mandays	16.1
2. Sleep Stations (1)	128.0	Sleeping bags	1/crewmember	3.8
		Locker volume	1/6 locker/crewmember	2.7
3. Hygiene Stowage Container (1)	15.0	No changeouts required		
4. Passenger Seats (1) (3)	92.0	No changeouts required		

Notes:
1 - Weights for these items are preliminary planning weights only.
2 - Charged to Orbiter dry weight.
3 - For nominal missions, 4 seats charged to Orbiter dry weight.
4 - Used only for missions with second Orbiter rescue capability.

6.0 SSME INERT WEIGHT

This section contains the inert weight status pending changes, and a time history for the SSME. Propellant data can be found in Section 9.0. The inert weight data was taken from SSME-82-1471 IL 2126-8045 "SSME Mass Properties Report (82-8)", August 26, 1982.

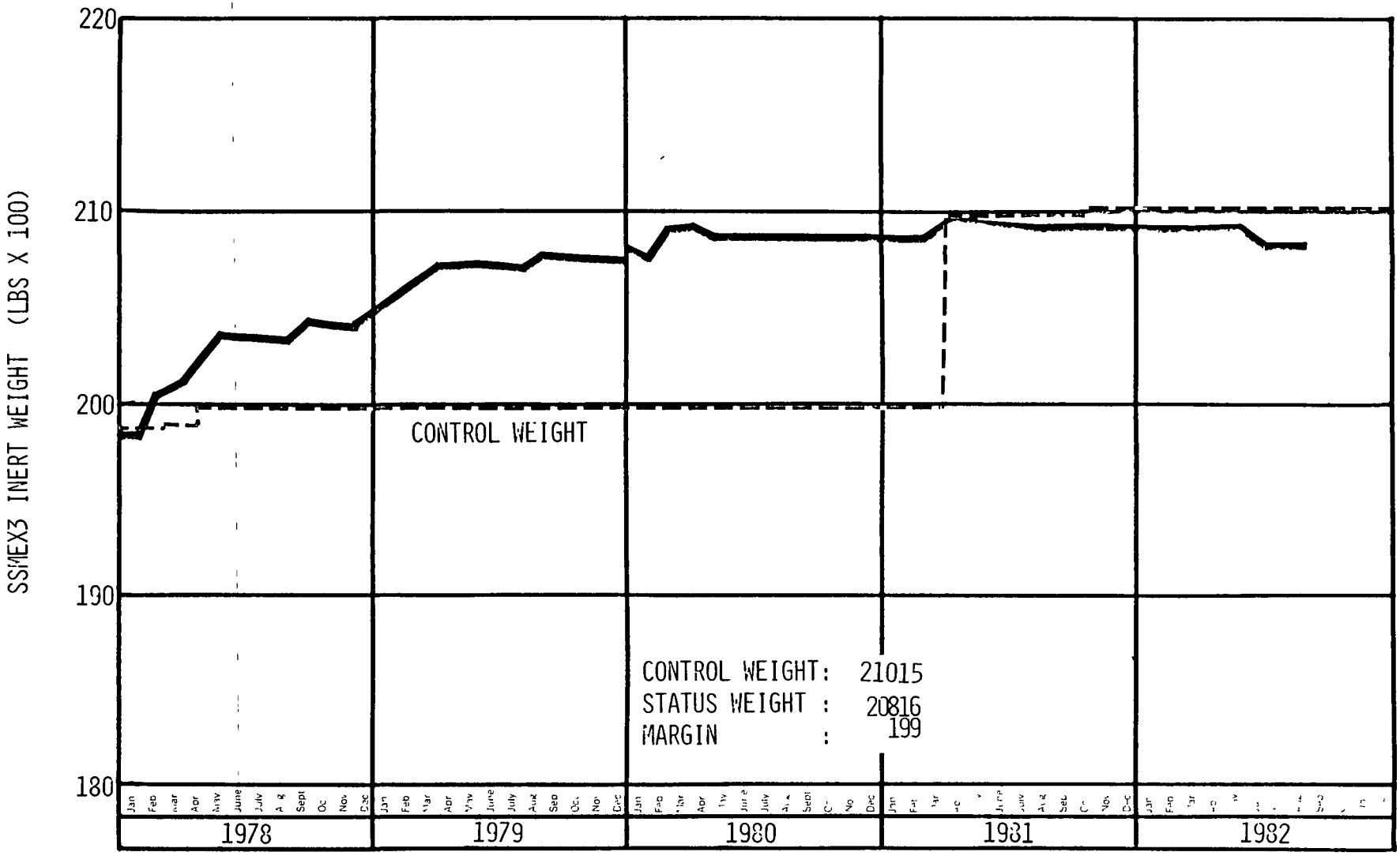
TABLE 6.1 - SSMEX3 WEIGHT CHANGE SUMMARY - STATUS 09-17-82

ITEM	STS-005 2005 2006 2007	STS-006 2011 2012 2015	STS-007 2011 2012 2015	STS-008 2011 2012 2015	STS-009 2017 2018 2019	STS-010 2011 2012 2015	STS-011 2017 2018 2019	STS-012 2020 2121 2022	STS-013 2011 2012 2015
RI-ROCKETDYNE PREV STATUS 07-01-82	20709	20816	20816	20816	20816	20816	20859	20859	20816
CHANGE TO OV-102E					43				
RI-ROCKETDYNE RPTED CHANGES					43				
RI-ROCKETDYNE RPTED INERT 08-26-82	20709	20816	20816	20816	20859	20816	20859	20859	20816
CHANGES NOT INCORPORATED									
NONE THIS REPORT.									
TOTAL SSPO RPTED SSME CHANGES					43				
SSPO RPTED SSME X 3 STATUS	20709	20816	20816	20816	20859	20816	20859	20859	20816

TABLE 6.2 - SSMEX3 POTENTIAL INERT WEIGHT CHANGES

ECP	ITEM	WEIGHT CHANGE, LB
	DEVELOPMENT PROBLEMS	18
	PRIMARY NOZZLE	
	ADDITION OF BAND TO TUBE BUNDLE (2023 & SUBS)	6
	MAIN FUEL VALVE	
	INCREASE STRUCTURAL CAPABILITY (2018 & SUBS)	6
	THERMAL PROTECTION	
	INCREASE SHIELD FOIL THICKNESS	21
	LOW PRESS OX TURBO PUMP	-12
	REMOVE 8 OF 12 KICKER BLADES FROM INDUCER	
	HEAT EXCHANGER	- 3
	PRIMARY TUBE BRAZED ON DOUBLERS AND SUSPENSION CHANGE (2021 & SUBS)	

FIGURE 6.1 - SSMEX3 INERT WEIGHT HISTORY



7.0 EXTERNAL TANK INERT WEIGHT

This section provides the inert weight status, pending changes and a time history for the External Tank. Propellant data can be found in Section 9.0. Operational ET vehicles are designated LWT and subsequent. DFI vehicles are designated ET-1 through 6. The inert weight data was taken from the quarterly report, MMC-ET-SE02-78, "Mass Properties Status Report," dated September 15, 1982.

TABLE 7.1 - ET INERT WEIGHT CHANGES - STATUS 09-17-82

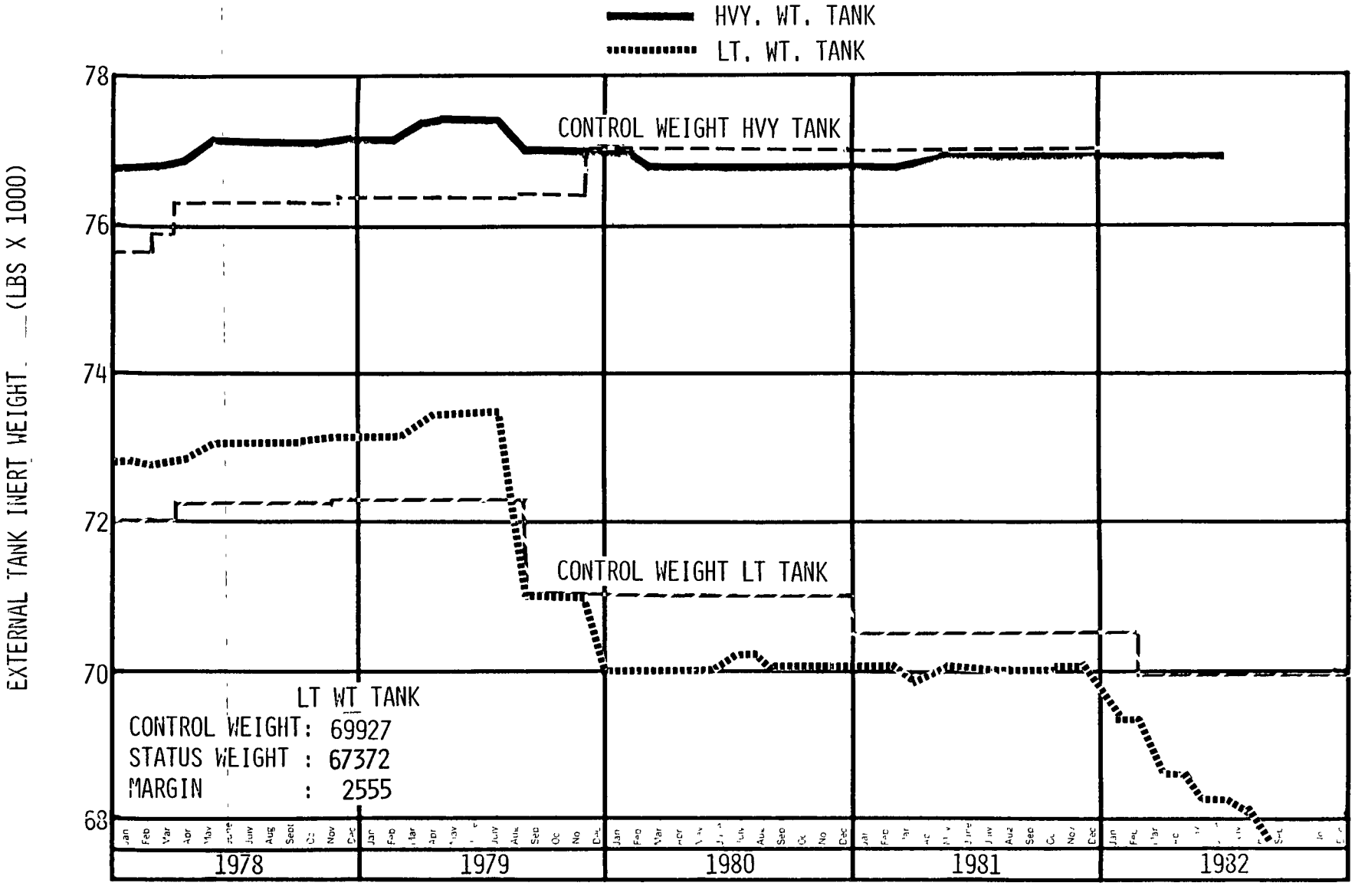
ITEM	STS-005 ET-05	STS-006 EWT-1	STS-007 ET-06	STS-008 EWT-2	STS-009 EWT-3	STS-010 EWT-4	STS-011 EWT-5	STS-012 EWT-6	STS-013 EWT-7
MMC PREV INERT STATUS & III 06-15-82	75190	67732	75453	67566	67596	67544	67544	67544	66334
* TPS MFG BOGS TO DRAWINGS UPDATE		-524							
* MISC DWG CALC'S AND WT UPDATES		-80		-404	-93	-571	-571	-571	
* ACTUAL WT RESULTS		-267							
* INCORP ACTUAL WTS		-37							
TOTAL MMC CHANGES		-908		-404	-93	-571	-571	-571	
MMC STATUS LEVEL III	75190	66824	75453	67162	67503	66973	66973	66973	66334
CHANGES NOT INCORPORATED									
* RELOCATE 100% SENSORS(S20718A)				10	10	10	10	10	
BOUYANCY	155	155	155	155	155	155	155	155	155
SSPO RPTED STATUS LEVEL III	75345	66979	75608	67327	67668	67138	67138	67138	66489
SEPARATION	883	883	883	883	883	883	883	883	883
TOTAL CHANGES		-908		-394	-83	-561	-561	-561	
SSPO RPTED STATUS LEVEL II	76228	67862	76491	68210	68551	68021	68021	68021	67372

* NEW CHANGE THIS REPORT.

TABLE 7.2 - ET POTENTIAL INERT WEIGHT CHANGES

REF	ITEM	LWT-3	LWT-4	LWT-7	LWT-11	LWT-16	LWT-23
	TOTALS	0	0	0	0	0	0

FIGURE 7.1 - EXTERNAL TANK (7 & SUBS) INERT WEIGHT HISTORY



8.0 SOLID ROCKET BOOSTER INERT WEIGHT AND PROPELLANT SUMMARY

This section provides the inert weight status, pending changes, a time history, and a propellant summary for the SRB. Operational SRB vehicles are designated A51 (left hand) and A52 (right hand). DFI vehicles are designated A07-A17 (left hand) and A08-A18 (right hand). The inert weight data was taken from "Solid Rocket Booster Mass Properties Status Report" Number 64, March 26, 1982. STS-6 data was taken from "Addendum A to SRB Mass Properties Report Number 64", dated April 29, 1982, and STS-7 data was taken from Addendum B to report number 64, dated May 24, 1982. STS-5 data was taken from "STS-5 Preliminary Pre-Flight Prediction", dated July 7, 1982.

TABLE 8.1 - SRB INERT WEIGHT CHANGES - STATUS 09-17-82

ITEM	STS-005 A15 A16	STS-006 A17 A18	STS-007 A19 A20	STS-008 A21 A22	STS-009 A23 A24	STS-010 A25 A26	STS-011 A27 A28	STS-012 A29 A30	STS-013 A31 A32
SSPO RPTED SRB INERT	380456	372320	370277	374772	381926	381926	380032	372878	372878
* NO CHANGE THIS REPORT									
TOTAL SSPO RPTED SRB CHANGES (1)									
SSPO RPTED SRB INERT STATUS	380456	372320	370277	374772	381926	381926	380032	372878	372878

* NEW CHANGE THIS REPORT.

(1) DIVIDED BY 10 * VALUES SHOWN IN TABLE 2.4 AND TABLE 2.5.

TABLE 8.2 - SRBX1 POTENTIAL WEIGHT CHANGES

PCIN	CODE	ITEM	STS-5	STS-6	STS-7	STS-8	STS-9	STS-10	STS-11	STS-12	STS-13
		REPLACE STRAPS WITH RETAINERS AND RUBBER WITH CORK ISSOLATION		-121	-121	-121	-121	-121	-121	-121	-121
		REINFORCE SEVERANCE CABLE		17	17	17	17	17	17	17	17
		INSULATION - SRM				-1373	-1373	-1373	-1373	-1373	-1373
				-104	-104	-1477	-1477	-1477	-1477	-1477	-1477

FIGURE 8.1 - SRBX2 (A51 & 52) INERT WEIGHT HISTORY

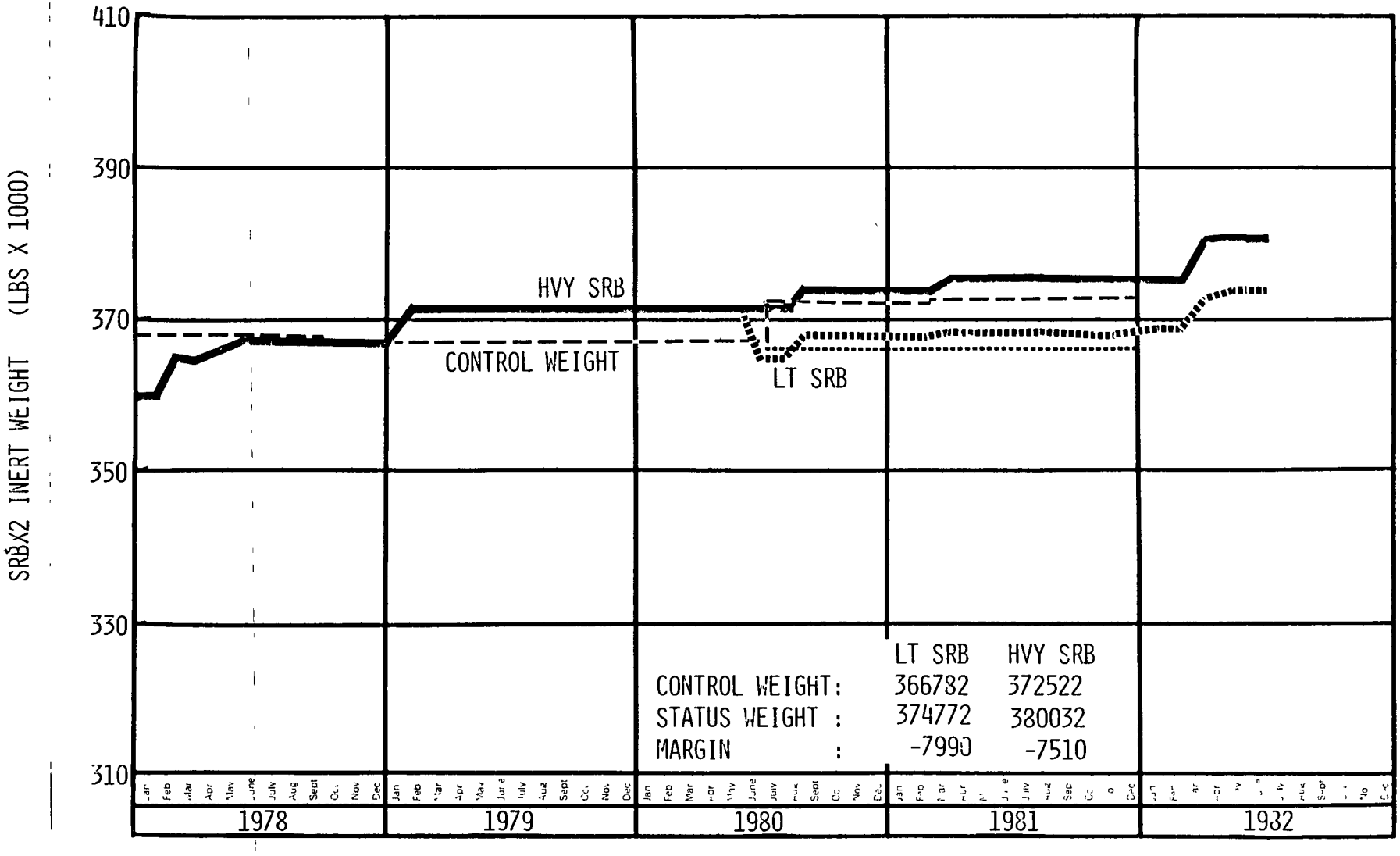


TABLE 8.3 - SRB PROPELLANT CONSUMED WEIGHT CHANGES - STATUS 09-17-82

ITEM	STS-005 A15 A16	STS-006 A17 A18	STS-007 A19 A20	STS-008 A21 A22	STS-009 A23 A24	STS-010 A25 A26	STS-011 A27 A28	STS-012 A29 A30	STS-013 A31 A32
PREV RPTED SRB PROP CONSUMED	2216514	2216970	2216970	2217504	2216048	2216048	2216048	2217504	2217504
* NO CHANGE THIS REPORT									
TOTAL SSPO RPTED SRB PROP CONS CHANGES									
SSPO RPTED SRB PROP CONSUMED	2216514	2216970	2216970	2217504	2216048	2216048	2216048	2217504	2217504

9.0 MPS PROPELLANT INVENTORIES

The Main Propulsion System (MPS) propellant inventories for STS and BRM Missions are summarized in Table 9. This accounts for propellants on the vehicle, Orbiter, SSME and ET.

TABLE 9.1

08/23/82 08.50.11

MPS PROPELLANT INVENTORY STS 5 REV Q

NOM T = T1 + 0.00

FUEL BIAS = 1378. MR = 6.0192
FPR = 5447. ULLAGE O2 = 2.87 SIGMA = 3. OBMR = 6.0376
DET FPR = 0. ULLAGE H2 = 2.86

	LH2	LO2	TOTAL
LOADED	228357.	1366891.	1595248.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET(HXT=1070.0 HUP= .3 LXT=436.1 LUP=2.4)	228050.	1362262.	1590312.
LOSS PRIOR TO ENG START CMD DBT M: S	104.	10000.	10104.
BOILOFF,BLEED,SEAL LEAK,POGO FLUSH	104.	10000.	10104.
LOAD AT ENGINE START COMMAND	228253.	1356891.	1585144.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET	227946.	1352262.	1580208.
TRANSFERED FROM ET	58.	172.	230.
USED FOR THR BUILDUP AND SRB IGN DELAY	1733.	9434.	11167.
LOAD AT SRB IGNITION COMMAND	226520.	1347457.	1573977.
ORB LINES	249.	3304.	3553.
SSME X 3	116.	1497.	1613.
ET	226155.	1342656.	1568811.
UNUSABLE	2228.	4798.	7026.
ORB LINES(LOX ECO T=3.398,NPSP= 7.2)	249.	550.	799.
SSME X 3	58.	1325.	1383.
ET WET WALLS,BELLOWS	0.	175.	175.
ET : LOX LINES ; LH2 LINES AND TANK	785.	0.	785.
FLIGHT PRESS	1136.	2748.	3884.
USABLE RESERVES	2152.	4673.	6825.
ORB LINES (FPR)	0.	2754.	2754.
SSME X 3	0.	0.	0.
ET (FPR)	774.	1919.	2693.
BIAS	1378.	0.	1378.
USABLE IMPULSE	222140.	1337986.	1560126.
USED AT OBMR	221365.	1336515.	1557880.
SHUTDOWN CONSUMPTION	717.	1299.	2016.
0 SSME FROM 100 PERCENT	0.	0.	0.
3 SSME FROM 65 PERCENT	717.	1299.	2016.
VENTED AFTER SSME VALVE CLOSURE	58.	172.	230.

TABLE 9.2

06/17/92 10.36.04

MPS PROPELLANT INVENTORY STS 6 , 8-13 REV V4H2

NOM T + TI + 0.00

FUEL BIAS = 1119. MR = 6.0000
FPR = 5926. ULLAGE O2 = 2.7 SIGMA = 3. OBMR = 6.0182
DET FPR = 0. ULLAGE H2 = 2.59

	LH2	LO2	TOTAL
LOADED	229223.	1370679.	1599902.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET(HXT=1064.6 HUP= .3 LXT=430.5 LUP=2.4)	228916.	1366050.	1594966.
LOSS PRIOR TO ENG START CMD DBT 94:32S	104.	11325.	11429.
BOILOFF,BLEED,SEAL LEAK,POGO FLUSH	104.	11325.	11429.
LOAD AT ENGINE START COMMAND	229119.	1359354.	1588473.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET	228812.	1354725.	1583537.
TRANSFERED FROM ET	58.	172.	230.
USED FOR THR BUILDUP AND SRB IGN DELAY	1733.	9434.	11167.
LOAD AT SRB IGNITION COMMAND	227386.	1349920.	1577306.
ORB LINES	249.	3304.	3553.
SSME X 3	116.	1497.	1613.
ET	227021.	1345119.	1572140.
UNUSABLE	2228.	4798.	7026.
ORB LINES(LOX ECO T=3.393,NPSP= 7.2)	249.	550.	799.
SSME X 3	58.	1325.	1383.
ET WET WALLS,BELLOWS	0.	175.	175.
ET : LOX LINES ; LH2 LINES AND TANK	785.	0.	785.
FLIGHT PRESS	1136.	2748.	3884.
USABLE RESERVES	1906.	4739.	6645.
ORB LINES (FPR)	0.	2754.	2754.
SSME X 3	0.	0.	0.
ET (FPR)	787.	1985.	2772.
BIAS	1119.	0.	1119.
USABLE IMPULSE	223251.	1340383.	1563634.
USED AT OBMR	222476.	1338912.	1561388.
SHUTDOWN CONSUMPTION	717.	1299.	2016.
0 SSME FROM 100 PERCENT	0.	0.	0.
3 SSME FROM 65 PERCENT	717.	1299.	2016.
VENTED AFTER SSME VALVE CLOSURE	58.	172.	230.

TABLE 9.3

08/20/82 14.56.14

MPS PROPELLANT INVENTORY STS 7 REV Q

NOM T = T1 + 0.00

FUEL BIAS = 1219. MR = 6.0000
FPR = 5406. ULLAGE O2 = 2.86 SIGMA = 3. OBMR = 6.0183
DET FPR = 0. ULLAGE H2 = 2.71

	LH2	LO2	TOTAL
LOADED	228947.	1367099.	1596046.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET(HXT=1066.5 HUP= .3 LXT=436.1 LUP=2.4)	228640.	1362470.	1591110.
LOSS PRIOR TO ENG START CMD DBT M: S	104.	10000.	10104.
BOILOFF,BLEED,SEAL LEAK,POGO FLUSH	104.	10000.	10104.
LOAD AT ENGINE START COMMAND	228843.	1357099.	1585942.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET	228536.	1352470.	1581006.
TRANSFERED FROM ET	58.	172.	230.
USED FOR THR BUILDUP AND SRB IGN DELAY	1733.	9434.	11167.
LOAD AT SRB IGNITION COMMAND	227110.	1347665.	1574775.
ORB LINES	249.	3304.	3553.
SSME X 3	116.	1497.	1613.
ET	226745.	1342864.	1569609.
UNUSABLE	2228.	4798.	7026.
ORB LINES(LOX ECO T=3.398,NPSP= 7.2)	249.	550.	799.
SSME X 3	58.	1325.	1383.
ET WET WALLS,BELLOWS	0.	175.	175.
ET : LOX LINES ; LH2 LINES AND TANK	785.	0.	785.
FLIGHT PRESS	1136.	2748.	3884.
USABLE RESERVES	1989.	4635.	6624.
ORB LINES (FPR)	0.	2754.	2754.
SSME X 3	0.	0.	0.
ET (FPR)	770.	1881.	2651.
BIAS	1219.	0.	1219.
USABLE IMPULSE	222893.	1338232.	1561125.
USED AT OBMR	222118.	1336761.	1558879.
SHUTDOWN CONSUMPTION	717.	1299.	2016.
0 SSME FROM 100 PERCENT	0.	0.	0.
3 SSME FROM 65 PERCENT	717.	1299.	2016.
VENTED AFTER SSME VALVE CLOSURE	58.	172.	230.

TABLE 9.4

06/17/02 10.51.05

MPS PROPELLANT INVENTORY BRK 1 REV V

AOA T + T1 + 0.00

FUEL BIAS = 1150. OBWP = 6.0000

FPR = 2725. ULLAGE O2 = 3.15 SIGMA = 2. OBWP = 6.0102

DET FPR = 0. ULLAGE H2 = 2.49

	LH2	LO2	TOTAL
LOADED	229459.	1371962.	1601412.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET(MXT=1363.0 HJP= .3 LXT=420.9 LUP= .3)	229143.	1367333.	1596476.
LOSS PRIOR TO ENG START CMD DBT 9:1:28S	104.	11250.	11354.
BOILOFF,BLEED,SEAL LEAK,POGO FLUSH	104.	11250.	11354.
LOAD AT ENGINE START COMMAND	229346.	1360712.	1590059.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET	229039.	1356083.	1585122.
TRANSFERED FROM ET	58.	172.	230.
USED FOR THR BUILDUP AND SRB IGN DELAY	1733.	9434.	11167.
LOAD AT SRB IGNITION COMMAND	227613.	1351278.	1578891.
ORB LINES	249.	3304.	3553.
SSME X 3	116.	1497.	1613.
ET	227248.	1346477.	1573725.
**********	**********	**********	**********
UNUSABLE	2298.	5933.	8231.
ORB LINES(LOX ECO T=2.598,NPSP= 9.0)	249.	1685.	1934.
SSME X 3	58.	1325.	1383.
ET WET WALLS,BELLOWS	0.	175.	175.
ET : LOX LINES ; LH2 LINES AND TANK	855.	0.	855.
FLIGHT PRESS	1136.	2748.	3884.
USABLE RESERVES	1682.	3203.	4885.
ORB LINES (FPR)	0.	1619.	1619.
SSME X 3	0.	0.	0.
ET (FPR)	532.	1584.	2116.
BIAS	1150.	0.	1150.
USABLE IMPULSE	223632.	1342143.	1565775.
USED AT OBMR	222635.	1339371.	1562506.
SHUTDOWN CONSUMPTION	939.	2100.	3039.
3 SSME FROM 100 PERCENT	939.	2100.	3039.
0 SSME FROM 65 PERCENT	0.	0.	0.
VENTED AFTER SSME VALVE CLOSURE	58.	172.	230.

TABLE 9.5

06/17/92 11.0[illegible].56
MPS PROPELLANT INVENTORY BRM 3A, 4 REV V

AOA T = T1 + 0.00

FUEL BIAS = 1150. MR = 5.[illegible]
FPR = 3622. ULLAGE O2 = 3.15 SIGMA = 2. OBMR = 5.[illegible]
DET FPR = 0. ULLAGE H2 = 2.49

	LH2	LO2	TOTAL
LOADED	229456.	1371962.	1601418.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET(HXT=1063.0 HUP= .3 LXT=438.9 LUP= .3)	229149.	1367333.	1596476.
LOSS PRIOR TO ENG START C&D DBT 9M:29S	104.	11250.	11354.
BOTLOFF,BLEED,SEAL LEAK,POGO FLUSH	104.	11250.	11354.
LOAD AT ENGINE START COMMAND	229346.	1360712.	1590056.
ORB LINES	249.	3304.	3553.
SSME X 3	58.	1325.	1383.
ET	229039.	1356083.	1585122.
TRANSFERED FROM ET	58.	172.	230.
USED FOR THR BUILDUP AND SRB IGN DELAY	1733.	9434.	11167.
LOAD AT SRB IGNITION COMMAND	227613.	1351278.	1578891.
ORB LINES	249.	3304.	3553.
SSME X 3	116.	1497.	1613.
ET	227249.	1346477.	1573725.
UNUSABLE	2293.	5933.	8231.
ORB LINES(LOX ECO T=2.598,NPSP= 9.0)	249.	1685.	1934.
SSME X 3	58.	1325.	1383.
ET WET WALLS,BELLOWS	0.	175.	175.
ET : LOX LINES ; LH2 LINES AND TANK	855.	0.	855.
FLIGHT PRESS	1136.	2748.	3884.
USABLE RESERVES	1666.	3106.	4772.
ORB LINES (FPR)	0.	1619.	1619.
SSME X 3	0.	0.	0.
ET (FPR)	516.	1487.	2003.
BIAS	1150.	0.	1150.
USABLE IMPULSE	223649.	1342240.	1565889.
USED AT OBMR	222652.	1339360.	1562620.
SHUTDOWN CONSUMPTION	939.	2100.	3039.
3 SSME FROM 100 PERCENT	939.	2100.	3039.
0 SSME FROM 65 PERCENT	0.	0.	0.
VENTED AFTER SSME VALVE CLOSURE	58.	172.	230.

10.0 PAYLOAD WEIGHT CHARGEABLE OPTIONS

This section offers a list of items that would be charged to the payload if it is required and would be considered as part of the total payload allocation.

TABLE 10.1 - HARDWARE PAYLOAD WEIGHT CHARGEABLE OPTIONS

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_0	Y_0	Z_0	Dry	Wet	Expend	Est	Cal	Act	
CFE														
P/L Bay Service Panels	3.2.1.1.2.1.4	TBD						TBD						Payload Unique
Docking Module Kit	3.2.1.1.2.1.5	3900									100			Baseline Docking Module Plus Orbiter Modification. (Baseline Airlock of 912 lbs In Cabin Can Be Removed)
A/L Tunnel Adapter Kit		900									100			EVA Airlock Mounts On Top Of Tunnel Adapter
Kit To Modify Orbiter & Airlock For Payload Bay Mounted Airlock		112												
Payload ARS Duct Kit	3.2.1.1.2.1.6	21									100			Supply Includes Orbiter-Cabin Air Duct and Valves
Additional ATCS Radiator Panel Kit	3.2.1.1.2.1.7		387						355			100		Increase Rejection Capacity By 7500 Btu/hr
Closed					1214.9	±61.5	473.0							
Open					1214.9	+150.0	366.0							
Second Manipulator System	3.2.1.1.2.1.16	905			957.2	88.9	443.9	855			0	0	100	
RMS Installation		266			985.2	96.6	416.4	379						
P/L Bay Purge and Vent Kit	3.2.1.1.2.1.4	TBD												Payload Unique
Ballast Locations														
Nose Wheel Well		1926			292.0	0.0	326.3							
Bay 2		1365			655.0	±91.0	408.0							Maximum/side
Bay 12		1388			1225.0	±91.0	408.0							Maximum/side
Bay 13		1349			1277.5	±91.0	408.0							Maximum/side
Aft Body		1000			1507.0	±51.0	310.0							Maximum/side

TABLE 10.1 - HARDWARE PAYLOAD WEIGHT CHARGEABLE OPTIONS (CONTINUED)

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_0	Y_0	Z_0	Dry	Wet	Expend	Est	Cal	Act	
CFE														
Bridge Fitting (Pair*)(1)	3.2.1.1.2.1.15													Any Special Equipment Added
1		262			609.0	±94	404.0	144.0				100		To The Baseline Attach Fitting
2		234			664.5	±94	404.0	149.6				100		Structure Such As A Unique
3		250			721.5	±94	404.0	214.0				100		Deployment Guide Is P/L
4		262			778.5	±94	404.0	240.2				100		Chargeable.
5		278			835.0	±94	404.0	279.4				100		* Passive Attach fittings Weight
6		278			891.0	±94	404.0	185.2				100		included in control wt. For
7		326			949.3	±94	404.0	247.0				100		each Active Attach fitting
8		294			1009.8	±94	404.0	251.6				100		add 77 lbs.
9		270			1065.2	±94	404.0	206.8				100		(1) Status weights do not in-
10		290			1115.5	±94	404.0	248.2				100		clude Passive attach fittings
11		290			1165.9	±94	404.0	224.2				100		weight of 28.1 lbs. For each
12		338			1220.0	±94	404.0	268.2				100		active fitting add 110 lbs.
13		390			1275.3	±94	404.0	190.4				100		
14		186			1304.3	±94	404.0				100			
Keel Fitting* (2)														* Keel fitting control weight
1		127			609.0	0	305.0				100			includes active retention
2		131			664.5	0	305.0	222.0			100			fitting weight.
3		168			721.5	0	305.0	222.0			100			
4		191			778.5	0	305.0	222.0			100			
5		190			835.0	0	305.0	222.0			100			(2) Status weights include
6		188			891.0	0	305.0	273.5				100		active retention
7		216			949.3	0	305.0	277.3				100		fitting weight of 80 lbs.
8		239			1009.8	0	305.0	252.7				100		
9		219			1065.2	0	305.0	258.5				100		
10		240			1115.5	0	305.0	249.9				100		
11		233			1165.9	0	305.0	265.0				100		
12		327			1220.0	0	305.0	222.0			100			
Less P/L Fitting Allocation		-675			1074.0	26.0	395.0							
KU-band Comm Kit	3.2.1.1.2.1.11	290			590	-90	480.0	263			100			Second Set
GFE														
Aft Upper Deck Displays & Controls	3.2.1.1.2.1.11	TBS												P/L Peculiar
MSS PCM Recorder Kit	3.2.1.1.2.1.11	60												

TABLE 10.2 - CREW EQUIPMENT/LIFE SUPPORT PAYLOAD WEIGHT CHARGEABLE OPTIONS

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_0	Y_0	Z_0	Dry	Wet	Expend	Est	Cal	Act	
GFE														
Crew Equipment	3.2.1.1.2.1.10													For Additional Crewmen or
Trash Container		.5/M									100			Mission Over 7-Day Duration
Seats & Restraints		101/M			543	-48.7	346				100			Seat No. 5
Seats & Restraints		101/M			490	-10	346				100			Seat No. 6
Seats & Restraints		101/M									100			Seat No. 7
Seats & Restraints		101/M			471	41	340				100			Seat No. 8 (Rescue only)
Seats & Restraints		101/M			506	52	342				100			Seat No. 9 (Rescue only)
Seats & Restraints		101/M			506	32	342				100			Seat No. 10 (Rescue only)
Stowage - Containers		TBS			437	-18	370	735			100			
Stowage - Containers		TBS			525	51	315	209			100			
Stowage - Packaging		SEE			437	-18	370	110			100			30% of Each Stowed Item's Wt.
Stowage - Packaging		NOTE			525	51	315	50			100			30% of Each Stowed Item's Wt.
Fecal Bags		0.8/M									100			Contingency Only
Urine Bags		1.0/M									100			Contingency Only
ARS Expendables & Hardware														
Aux O2 Sys		75	141		794	89	329				100			Required when only 2 EPS tank sets are used.
OXYGEN				1.92/D						1.92/D				Airlock in Cabin & Cabin Leakage 8 lb/day.
Orbiter Cabin Leakage	3.2.1.1.2.1.19			2.4/D						2.4/D				Airlock Outside Cabin on Tunnel Adapter & Cabin Leakage 10 lb/day.
Crewman metabolic consumption	3.2.1.1.2.1.9			2.08/MD	750	0	308			2.08/MD	100			
EVA Support														Orbiter provides 2-Man Capability With Expendables for 3 EVA's
(1) ALSA O_2 Recharge				1.6							100			(Including Rescue)
(2) EVA Airlock Repressurization				2.7							100			
(3) Prebreathe Cycle				1.5/M							100			
(4) Suit Purge Cycle				1.0/M							100			
NITROGEN														
N_2 Tank Kit (Dry) Including Tank Mounting Brackets & Plumbing		83	143								100			
Gaseous N_2 Per Tank				60							100			40 lb Minimum Usable/Tank
Orbiter Cabin Leakage	3.2.1.1.2.1.19			6.08/D						6.08/D	100			Airlock in Cabin & Cabin Leakage 8.0 lb/day.
Airlock Repress				7.6/D						7.6/D	100			Airlock Outside Cabin on Tunnel
LIOH Canisters		7.0/2MD			490	0	315	5.7/2MD			100			Above 28 md & 96 hr Contingency. Each Canister Has 2-man-day.

TABLE 10.2 - CREW EQUIPMENT/LIFE SUPPORT PAYLOAD WEIGHT CHARGEABLE OPTIONS (CONTINUED)

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_O	Y_O	Z_O	Dry	Wet	Expend	Est	Cal	Act	
GFE														
EVA Hardware & Expendables	3.2.1.1.2.1.3													
Extravehicular Mobility Unit (EMU) Including One charge of Expendables.			256						256		100			Additional Units. Water not included.
LIOH Recharge		6.8												
Spare Battery		9.8												
Crewman W/O Personal Equip	3.2.1.1.2.1.10	170			495	10	344				100			No. 5
					495	-10	344							No. 6
					529	-49	345							No. 7
					467	41	343							No. 8 Rescue Only
					502	52	344							No. 9 Rescue Only
					502	32	344							No. 10 Rescue Only
Crew Equipment	3.2.1.1.2.1.10													
Clothing Module		22.0 lb/ man									100			7 Day Mission
Survival Kit		42						42			100			Up to 6 Crewmen.
Crew Life Vest		2.5/M						2.5/M			100			
Tissue W/Dispenser		1.5/M									100			7 Day Mission.
Ancillary Crew Provisions Shipset		41.5/ 2 men												
Orbiter Stowage Provisions Shipset		172/ 42 man-day												Stowage Packaging Such as Trays, Locker Inserts, Bags, Straps

TABLE 10.2 - CREW EQUIPMENT/LIFE SUPPORT PAYLOAD WEIGHT CHARGEABLE OPTIONS (CONCLUDED)

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_0	Y_0	Z_0	Dry	Wet	Expend	Est	Cal	Act	
GFE														
Crew Equipment (Continued)	3.2.1.1.2.1.9 /.10													
Personal Hygiene Kit		3.2/M			557	-43	356				100			
Galley Equipment Food Tray		0.9/M												
Personal Rescue System (PRS)	3.2.1.1.2.1.10													PRS Assembly Includes the PRE and the POS.
Personal Rescue Enclosure (PRE)		24.5						24.5			100			
Portable Oxygen System (POS)			15.0						15.0		100			
Recharge Kit for POS				4.0							100			Recharge Kit for 3 Hour Capability.
FOOD														
Menu Food				3.33	465	-65	368	3.34/ md			100			Per Man-Day.
Pantry Food				2.06	465	-70	368	2.06/ md			100			Per Man-Day.
Contingency Food								6.06/M						Per Man-Mission

TABLE 10.3 - ELECTRICAL ENERGY PAYLOAD WEIGHT CHARGEABLE OPTIONS

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_0	Y_0	Z_0	Dry	Wet	Expend	Est	Cal	Act	
Electrical Energy Supply	3.2.1.1.2.1.13													
EPS Kits Under Payload Bay Liner														56 lb O_2 available to ARS From Each Cryogenic O_2 Tank Added
														C.G.'s Reflect Tank Set Wet Condition
Tank Set #4 Lift-off Wt.		770	1643	844	998.6	-30.9	299.7	779	1652	848	100			
Tank Set #4 Landing Wt.		770	799	0	948.2	1.5	300.6	779	806	0	100			
Tank Set #5 Lift-off Wt.		684	1803	844	949.0	-30.1	300.0	684	1557	848	100			
Tank Set #5 Landing Wt.		684	959	0	949.0	-2.0	300.0	684	713	0	100			
Tank Set #6 Lift-off Wt.														P/L Bay Location TBD
Tank Set #6 Landing Wt.														P/L Bay Location TBD
Tank Set #7 Lift-off Wt.														P/L Bay Location TBD
Tank Set #7 Landing Wt.														P/L Bay Location TBD
EPS Tank Sets in Cargo Bay		TBD	TBD	TBD										Kits With P/L Unique Mounting
Electrical Power Umbilical Harness		TBD												

TABLE 10.4 - PROPULSION HARDWARE & PROPELLANTS PAYLOAD WEIGHT CHARGEABLE OPTIONS

ITEM	JSC 07700 Vol X Reference	Control Weight			Center of Gravity			Current Status			Maturity (%)			Remarks
		Dry	Wet	Expend	X_O	Y_O	Z_O	Dry	Wet	Expend	Est	Cal	Act	
GFE														
RCS Propellants	3.2.1.1.2.1.1			TBD						TBD				As Required by P/L Within Restraints of Orbiter RCS Tank Volumes
OMS V Kits		TBD	TBD	TBD										
V 500 ft/sec Lift-off Wt.														
V 500 ft/sec Landing Wt.														
V 1000 ft/sec Lift-off Wt														
V 100o ft/sec Landing Wt.														
V 1500 ft/sec Lift-off Wt														
V 1500 ft/sec Landing Wt.														
Payload Propellant Dump System														
Removable Kit (Storage Prop)		TBD												
Removable Kit (Cryo Prop)		TBD												

APPENDIX A MASS PROPERTIES

This Appendix provides Mass Properties for the missions defined in Section 1 of this document. Each mission consists of two pages; Cargo Module (Payload/STS operator) and the vehicle elements and consumables.

Table A-9 contains the Orbiter weight and c.g. data to be used for performance analysis of the Operational Missions STS-5 and subsequent.

TABLE STS-5 A-1.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/28 14.47.19

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-102 STS-5 INERT	151888	1060.1	-.5	366.6	832774	5250840	5558212	6080	79797	-1681
SSME X3 INERT	20709	1494.0	.4	384.7	23580	19223	17589	-22	-2482	95
BOUYANCY	80	1113.7	-.8	368.5	0	0	0	0	0	0
PERSONNEL 4M/5D	3741	534.3	11.6	380.9	2515	15693	15961	1823	223	279
ORBITER W/O CONSUMABLES	176418	1099.9	-.1	369.0	860391	6291635	6596353	3940	102891	-1127
NON-PROP CONSUM AT SRB IGN	5465	997.4	3.6	346.5	9938	127119	128144	-1698	16038	-481
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	9900	1425.6	-94.9	476.1	2154	1821	1807	6	24	744
OMS PROPELLANT - RIGHT	9900	1425.6	94.9	476.1	2154	1821	1807	-6	24	-744
RCS PROPELLANT - FWD	2464	317.8	5.4	365.4	286	17	299	-2	5	-1
RCS PROPELLANT - AFT	5424	1345.0	0.0	470.1	9546	1079	10013	0	100	0
ORBITER MODULE TOTAL AT SRB IGN	214737	1131.9	.2	380.4	983001	7402284	7699481	562	279926	-2365
CARGO MODULE TOTAL	32135	1019.8	3.4	374.4	31458	267575	275717	-12546	10815	1943
ORBITER PLUS CARGO AT SRB IGN	246872	1117.3	.6	379.7	1014741	7745860	8051040	-14144	294829	-538
ET-5 INERT	76073	1373.9	1.9	427.7	393355	4464293	4452461	-519	194616	4064
BOUYANCY	155	1373.9	1.9	427.7	0	0	0	0	0	0
MPS FUEL AT SRB IGN Q BUDGET	226155	1615.4	0.0	400.0	0	3588388	3588388	0	0	0
MPS LOX AT SRB IGN Q BUDGET	1342656	734.5	.6	401.4	74475	4432954	4382358	135363	313670	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1645462	885.2	.6	402.4	478978	49053839	48980353	123906	669844	31653
SRB-15 LEFT SEPARATION	183137	1803.6	-251.0	401.0	184959	11444528	11448361	-25515	7180	617
SRB-15 LEFT INFLIGHT LOSSES	1115119	1696.4	-250.5	400.0	734319	35295754	35295774	1376	-205	2
SRB-15 LEFT MODULE TOTAL	1298256	1711.5	-250.6	400.1	919320	47130491	47134318	-25958	10615	602
SRB-16 RIGHT SEPARATION	182728	1803.4	251.0	401.0	184786	11422038	11426060	22623	9418	-972
SRB-16 RIGHT INFLIGHT LOSSES	1115986	1696.8	250.5	400.0	734939	35361222	35361248	-1058	-502	0
SRB-16 RIGHT MODULE TOTAL	1298714	1711.8	250.6	400.1	919767	47168415	47172437	23371	12529	-954

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-5 A-1.2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/28 14.23.41

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
SBS PAYLOAD	7218	935.3	-.1	380.7	2141	2179	563	4	0	0
TELESAT E PAYLOAD	7365	1061.1	0.0	381.0	2248	2263	658	-5	0	0
DEPLOYABLE PAYLOAD	14583	998.8	-.0	380.9	4389	16894	13673	9	30	0
SBS ASE	2389	934.5	11.5	368.8	2106	1024	1896	0	0	152
TELESAT E ASE	2394	1060.3	11.5	368.8	2106	1024	1896	0	0	152
P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
P/L UTILITY KITS	46	924.8	-6.3	387.0	73	266	335	18	0	0
PRIMARY PAYLOAD	19415	998.2	2.8	377.9	8897	23614	22197	41	19	193
STUDENT EXPERIMENTS	99	520.9	61.8	374.1	0	0	0	0	0	0
MV0570A ACIP	182	1173.1	-11.3	293.4	10	683	683	40	-39	-3
MV0581A ACIP/OEX RECORDER	95	440.8	3.2	309.0	3	2	2	0	0	0
GET AWAY SPECIAL--BF12	635	1226.7	82.3	400.8	29	34	42	0	0	0
TILE GAP EXPERIMENT	7	594.0	.4	295.0	2	0	2	0	0	0
MATERIALS TEST EXPERIMENT	50	1181.0	1.0	458.0	2	2	2	0	0	0
ANCILLARY PAYLOAD	1068	1075.9	53.1	373.8	938	20057	19908	924	1205	334
PAYLOAD CHARGEABLE CARGO	20483	1002.3	5.4	377.7	10391	44994	43977	1818	1155	482
MV0082A RMS ARM	-1001	922.4	-82.8	444.5	97	9676	9738	-428	-23	19
MV0610A FLIGHT DECK SEAT	101	537.0	0.0	441.0	0	0	0	0	0	0
DELETIONS--S21556 R1	-381	674.5	-.7	375.5	238	3831	3594	-32	-560	6
MANIFEST ITEMS	-1281	879.1	-64.9	424.3	929	15081	14945	-1223	552	-333
MV0073A P/L + DFI ATTACH HDW.	2206	1027.1	-.2	371.1	3696	6283	7915	98	82	5
MV0073A RET. FTG. ALLOW	-675	1074.0	26.0	395.0	2	45	45	0	0	0
MV0400A MADS 1	94	1139.7	-40.3	405.7	44	39	37	-10	9	-15
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.	223	876.2	2.8	296.6	263	804	1035	-152	-6	-15
MV0541A VIBRO-ACOUSTIC CBLS.	7	851.3	15.8	323.6	1	115	115	-10	-2	0
MV0542A DFI ASSEMBLY	9832	1054.8	-5.8	373.8	17045	199626	207342	-11742	7323	422
MV0548A CCTV CAMERAS	72	968.6	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STA. CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTRS	65	560.5	-38.3	442.3	8	2	8	0	0	3
MV0578A DAC WIRING	5	808.9	-68.7	386.3	4	81	79	-5	-8	1
MV0610A MID DECK SEAT - 6	101	488.6	-9.6	346.8	0	0	0	0	0	0
MV0711A X603 I/F HARNESS	86	590.4	-20.7	378.4	119	15	112	0	0	-1
MV0712A SMCH	167	884.0	20.3	361.2	200	2733	2922	14	32	6
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
MV0725A SIP SMCH	38	949.0	3.3	402.4	64	28	90	0	0	0
MV0729A GAS AFD JUMPER SET	1	554.0	39.0	441.5	0	0	0	0	0	0
MV0761A MICRO MOD P/L UMBIL.	138	986.1	-47.0	377.2	139	1891	2003	-186	-115	38
P/L UMBIL. + OEX PROV.	26	749.1	-1.4	351.4	30	1079	1094	4	6	-1
AUXILIARY O2 SYS HDW	75	794.0	89.0	329.0	2	2	2	0	0	0
ONBOARD H2 DETECTION	26	1375.0	0.0	375.0	55	0	55	0	0	0
BALLAST PROVISIONS	22	1508.0	0.0	277.9	7	0	7	0	0	0
STS OPER CHARGEABLE CARGO	12933	1033.6	-6.5	374.2	23632	241892	251273	-12393	8533	153
PRIMARY PAYLOAD	19415	998.2	2.8	377.9	8897	23614	22197	41	19	193
ANCILLARY PAYLOAD	1068	1075.9	53.1	373.8	938	20057	19908	924	1205	334
MANIFEST ITEMS	-1281	879.1	-64.9	424.3	929	15081	14945	-1223	552	-333
STS OPER CHARGEABLE CARGO	12933	1033.6	-6.5	374.2	23632	241892	251273	-12393	8533	153
CARGO MODULE TOTAL	32135	1019.8	3.4	374.4	31458	267575	275717	-12546	10815	1943

TABLE STS-6 A-2.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/25 11.33.26

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-099 STS-6 INERT	149618	1062.9	-0.0	365.4	838902	5835419	6131476	6845	116322	-2712
SSME X3 INERT	20816	1495.0	.3	384.5	23700	19289	17706	-24	-2487	104
BOUYANCY	80	1115.7	0.0	367.5	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	174128	1103.5	.4	368.2	866429	6865195	7158237	1769	137095	-2118
NON-PROP CONSUM AT SRB IGN	5496	994.9	2.9	346.5	9895	130167	131113	-1521	16276	-457
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	9650	1426.5	-94.9	476.2	2099	1739	1727	7	21	725
OMS PROPELLANT - RIGHT	9650	1426.5	94.9	476.2	2099	1739	1727	-7	21	-725
RCS PROPELLANT - FWD	2446	317.8	5.3	365.3	284	17	297	-2	5	-1
RCS PROPELLANT - AFT	4970	1345.4	0.0	470.5	8708	1053	9197	0	98	0
ORBITER MODULE TOTAL AT SRB IGN	211506	1134.1	.6	379.5	986078	7955827	8240473	-1886	309453	-3504
CARGO MODULE TOTAL	48622	1078.6	3.5	394.9	24011	288245	293650	-9391	16943	277
ORBITER PLUS CARGO AT SRB IGN	260128	1123.7	1.1	382.4	1012189	8272384	8560479	-12649	319095	-2845
ET LWT-1 INERT	67707	1351.2	2.8	424.7	361528	4052747	4048722	3498	161507	7213
BOUYANCY	155	1351.2	2.8	424.7	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1640425	881.2	.6	402.2	443931	47982518	47920146	132556	585519	34980
SRB-17 LEFT SEPARATION	178815	1800.8	-250.9	401.0	182029	11358038	11361771	-25227	7320	617
SRB-17 LEFT INFLIGHT LOSSES	1115773	1696.9	-250.5	400.0	733932	35363122	35363132	1270	59	0
SRB-17 LEFT MODULE TOTAL	1294588	1711.3	-250.6	400.1	916000	47080290	47084005	-25338	10835	604
SRB-18 RIGHT SEPARATION	178924	1800.9	251.1	401.0	182160	11358875	11362876	22364	9537	-973
SRB-18 RIGHT INFLIGHT LOSSES	1115778	1696.9	250.5	400.0	733937	35363201	35363240	-1396	-170	-1
SRB-18 RIGHT MODULE TOTAL	1294702	1711.3	250.6	400.1	916142	47082087	47086106	23045	12828	-953

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-6 A-2 2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/24 11.03.30

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
TWO-STAGE IUS	32507	1132.8	.1	399.9	6665	17967	18105	73	-18	-3
TDRS-A SPACECRAFT	5000	965.4	.3	399.6	1188	1734	1779	34	9	12
DEPLOYABLE PAYLOAD	37507	1110.5	.1	399.9	7853	45912	46095	76	38	9
IUS-ASE (LAUNCH - RETURN)	5843	1136.2	-1.1	395.7	6189	20758	24602	-2536	1428	-71
SMCH CABLE	786	758.0	-13.0	340.0	64	5141	5102	0	0	0
P/L RECORDER	60	421.0	-6.0	378.0	0	1	1	0	0	0
MV0073A P/L RETENTION FITTINGS	451	1224.8	-38.9	360.8	1760	107	1163	571	683	-130
MV0702A P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
WT GROWTH ALLOWANCE	207	1136.2	-1.1	395.7	773	6549	6541	0	0	0
PRIMARY PAYLOAD	44857	1108.0	-.7	397.8	17561	108751	113218	-1520	5287	81
MV0570A ACIP	182	1154.6	-12.7	295.6	12	825	825	53	-51	-5
MV0581A ACIP/OEX RECORDER	95	440.8	3.2	309.0	3	2	2	0	0	0
CFES	764	463.5	-56.2	362.3	0	0	0	0	0	0
MLR	170	433.8	14.9	355.7	4	1	3	0	0	0
GET AWAY SPECIAL--BF 3 + 4	1796	749.1	78.8	395.5	0	0	0	0	0	0
NOSL EXPERIMENT	52	434.0	28.0	363.0	0	0	0	0	0	0
EEVT EXPERIMENT	83	433.8	28.1	363.0	0	0	0	0	0	0
ANCILLARY PAYLOAD	3142	663.2	32.8	375.5	2801	24772	26468	3955	61	743
PAYLOAD CHARGEABLE CARGO	47999	1078.9	1.5	396.4	21387	259200	265755	-6986	11649	351
RMS ARM	-935	928.5	-83.9	444.5	75	9135	9191	-353	-21	14
GALLEY	-164	469.0	-67.0	367.0	14	14	3	0	0	0
H2O DISPENSING SYSTEM	23	470.8	-69.0	367.3	2	2	1	0	0	0
MANIFEST ITEMS	-1076	868.2	-81.6	434.3	254	14897	14792	-561	922	-20
MV0073A P/L ATTACH HDW	1126	1134.4	0.0	381.3	2076	1541	2781	0	382	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	45	45	0	0	0
MV0073A P/L I/F HDW ALLOW	-451	1224.8	-38.9	360.8	1760	107	1163	-571	-683	130
MV0400A MADS 1	4	895.1	30.1	318.1	839	11919	12387	210	-91	-78
MV0408A MADS 2	653	897.1	31.8	318.2	838	11959	12486	231	-96	-77
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	355	238	546	0	0	0
MV0525A EPS TANK SET 4 HDW-PART	208	878.6	1.0	296.6	232	708	910	-136	-5	-17
MV0548A CCTV	72	967.5	-13.8	438.3	100	1927	2025	-436	-3	1
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0711A X603 I/F HARNESS	86	590.7	-22.2	378.4	116	15	109	1	0	-1
MV0712A SMCH CABLE	2	941.0	0.0	307.0	0	0	0	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
H2 SAMPLES	26	1375.0	0.0	375.0	55	0	55	0	0	0
STS OPER CHARGEABLE CARGO	1699	937.1	6.8	379.5	4769	47129	47261	1370	3486	-824
PRIMARY PAYLOAD	44857	1108.0	-.7	397.8	17561	108751	113218	-1520	5287	81
ANCILLARY PAYLOAD	3142	663.2	32.8	375.5	2801	24772	26468	3955	61	743
MANIFEST ITEMS	-1076	868.2	-81.6	434.3	254	14897	14792	-561	922	-20
STS OPER CHARGEABLE CARGO	1699	937.1	6.8	379.5	4769	47129	47261	1370	3486	-824
CARGO MODULE TOTAL	48622	1078.6	3.5	394.9	24011	288245	293650	-9391	16943	277

TABLE STS-7 A-3.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 15.22.23

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-099 STS-7 INERT	149921	1062.0	.1	365.5	814245	5093265	5392380	4339	84374	2599
SSME X3 INERT	20816	1495.0	.3	384.5	23700	19289	17706	-24	-2487	104
BOUYANCY	80	1115.7	0.0	367.7	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	174431	1102.7	.4	368.3	841752	6125495	6421611	-856	105104	3102
NON-PROP CONSUM AT SRB IGN	5465	997.6	2.9	346.7	9886	128589	129544	-1531	16152	-455
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	10250	1424.5	-94.9	476.1	2230	1939	1923	5	27	771
OMS PROPELLANT - RIGHT	10250	1424.5	94.9	476.1	2230	1939	1923	-5	27	-771
RCS PROPELLANT - FWD	2446	317.8	5.3	365.3	284	17	297	-2	5	-1
RCS PROPELLANT - AFT	4970	1345.4	0.0	470.5	8709	1053	9197	0	38	0
ORBITER MODULE TOTAL AT SRB IGN	212978	1134.9	.7	380.1	966224	7235170	7522983	-4648	283786	1746
CARGO MODULE TOTAL	36819	1043.7	-7.2	382.7	24593	318740	321570	23271	561	-1001
ORBITER PLUS CARGO AT SRB IGN	249797	1121.5	-.5	380.5	991283	7610325	7901341	23484	282727	605
ET 6 INERT	76336	1370.9	2.9	428.1	392790	4454338	4441528	-323	-913	4
BOUYANCY	155	1370.9	2.0	428.1	0	0	0	0	0	0
MPS FUEL AT SRB IGN	226745	1614.1	0.0	400.0	0	3619985	3619985	0	0	0
MPS LOX AT SRB IGN	1342864	734.4	.6	401.4	74475	4436282	4385688	135370	313686	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1646523	885.1	.6	402.4	478846	49029301	48954526	132068	476954	28026
SRB-19 LEFT SEPARATION	177842	1802.1	-250.9	401.0	180939	11309780	11313379	-25538	5754	609
SRB-19 LEFT INFLIGHT LOSSES	1115773	1696.8	-250.6	400.0	733931	35362436	35362462	1132	-26	-1
SRB-19 LEFT MODULE TOTAL	1293615	1711.3	-250.6	400.1	914906	47039358	47042952	-25451	9214	593
SRB-20 RIGHT SEPARATION	177855	1802.2	251.0	401.0	180999	11308866	11312499	22608	7308	-951
SRB-20 RIGHT INFLIGHT LOSSES	1115777	1696.9	250.5	400.0	733937	35363460	35363492	-1268	-252	0
SRB-20 RIGHT MODULE TOTAL	1293632	1711.4	250.6	400.1	914977	47039491	47043131	23083	11043	-943

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-7 A-3 2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 15.16.27

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
TELESAT-F SPACECRAFT	7542	1096.5	0.0	381.6	2246	2262	657	-5	0	0
PALAPA-B1 SPACECRAFT	7531	1242.1	0.0	383.4	2250	2260	650	0	0	0
DEPLOYABLE PAYLOAD	15073	1169.2	0.0	382.5	4499	21767	18549	-4	213	0
SPAS-01	3967	905.1	-.2	385.6	0	0	0	0	0	0
OSTA-2 SPACECRAFT	4469	994.9	-4.0	413.6	0	0	0	0	0	0
TELESAT-F/ASE	2394	1095.7	11.5	368.8	2106	1024	1896	0	0	152
PALAPA-B1/ASE	2394	1241.3	11.5	368.8	2106	1024	1896	0	0	152
MV0702A P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
PRIMARY PAYLOAD	28300	1104.5	1.3	385.5	9936	94100	91690	1236	-4528	-4
MV0570A ACIP	182	1154.6	-12.7	295.6	12	325	825	53	-51	-5
MV0581A ACIP/OEX RECORDER	95	440.8	3.2	309.0	3	2	2	0	0	0
CFES	764	463.5	-56.2	362.3	0	0	0	0	0	0
GET AWAY SPECIALS (7)	3170	728.8	-78.8	395.2	0	0	0	0	0	0
ANCILLARY PAYLOAD	4211	692.6	-70.0	383.0	923	20648	20387	-23	-170	-432
TOTAL PAYLOAD CHARGEABLE	32511	1051.1	-8.0	385.2	14893	248999	250341	24439	-3866	-293
GALLEY	-164	469.0	-67.0	367.0	14	14	3	0	0	0
H2O DISPENSING SYSTEM	23	470.1	-69.0	367.3	2	2	1	0	0	0
MANIFEST ITEMS	-141	468.8	-66.7	367.0	12	12	2	0	0	0
MV0073A P/L ATTACH HDW	2751	1075.2	0.0	367.8	4676	10417	12393	0	798	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	45	45	0	0	0
MV0400A MADS 1	4	895.1	30.1	318.1	839	11919	12387	210	-91	-78
MV0408A MADS 2	653	897.1	31.8	318.2	838	11959	12486	231	-96	-77
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.-PAR	208	878.6	1.0	296.6	232	708	910	-136	-5	-17
MV0548A CCTV	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0711A X603 I/F CABLE	86	590.7	-22.2	378.4	116	15	109	1	0	-1
MV0712A SMCH CABLE	702	758.0	-13.0	340.0	64	5141	5102	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0714A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECOR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SWITCH PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
STS OPER CHARGEABLE CARGO	4449	970.9	-3.4	363.7	9430	73956	75861	176	3247	-599
PRIMARY PAYLOAD	28300	1104.5	1.3	385.5	9936	94100	91690	1236	-4528	-4
ANCILLARY PAYLOAD	4211	692.6	-70.0	383.0	923	20648	20387	-23	-170	-432
MANIFEST ITEMS	-141	468.8	-66.7	367.0	12	12	2	0	0	0
STS OPER CHARGEABLE CARGO	4449	970.9	-3.4	363.7	9430	73956	75861	176	3247	-599
CARGO MODULE TOTAL	36819	1043.7	-7.2	382.7	24593	318740	321527	23271	561	-1001

TABLE STS-8 A-4.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/28 15.34.48

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-099 STS-8 INERT	149921	1062.0	.1	365.5	814245	5093265	5392380	4339	84374	2599
SSME X3 INERT	20816	1495.0	.3	384.5	23700	19289	17706	-24	-2487	104
BOUYANCY	80	1115.7	0.0	367.7	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	174431	1102.7	.4	368.3	841752	6125495	6421611	-856	105104	3182
NON-PROP CONSUM AT SRB IGN	5465	997.6	2.9	345.7	9886	128589	129544	-1531	16152	-455
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	10150	1424.8	-94.9	476.1	2208	1905	1889	5	26	763
OMS PROPELLANT - RIGHT	10150	1424.8	94.9	476.1	2208	1905	1889	-5	26	-763
RCS PROPELLANT - FWD	2446	317.8	5.3	365.3	284	17	297	-2	5	-1
RCS PROPELLANT - AFT	4970	1345.4	0.0	470.5	8709	1053	9197	0	98	0
ORBITER MODULE TOTAL AT SRB IGN	212778	1134.7	.7	380.0	965393	7231842	7519665	-4641	282708	1749
CARGO MODULE TOTAL	57023	1032.2	.9	392.5	25630	434246	438554	124	24729	332
ORBITER PLUS CARGO AT SRB IGN	269801	1113.0	.7	382.6	992543	7769520	8060132	-4748	294994	2109
ET LWT-2 INERT	68055	1352.6	2.6	424.1	364271	4084624	4080580	3394	163425	6979
BOUYANCY	155	1352.6	2.6	424.1	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1640773	881.4	.6	402.1	446307	48050023	47987975	131188	584534	34666
SRB LEFT SEPARATION	178974	1804.2	-250.9	401.0	133417	11242158	11245946	-21677	7632	949
SRB LEFT INFLIGHT LOSSES	1117164	1696.8	-250.5	400.0	738056	35510044	35510062	875	-39	0
SRB LEFT MODULE TOTAL	1296138	1711.6	-250.6	400.1	871512	47136293	47140071	-22231	11169	936
SRB RIGHT SEPARATION	178974	1804.2	250.9	401.0	133417	11242158	11245946	21677	7632	-949
SRB RIGHT INFLIGHT LOSSES	1117164	1696.8	250.5	400.0	738056	35510014	35510062	-875	-39	0
SRB RIGHT MODULE TOTAL	1296138	1711.6	250.6	400.1	871512	47136263	47140071	22232	11169	-935

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-8 A-4.2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 10.10.15

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
TWO-STAGE IUS	32507	1132.8	.1	399.9	6665	17967	18105	73	-18	-3
TDRS-B SPACECRAFT	5000	965.4	.3	399.6	1188	1734	1779	34	9	12
INSAT 1-B/SSUS-D	7345	754.3	0.0	385.2	0	0	0	0	0	0
DEPLOYABLE PAYLOAD	44852	1052.2	.1	397.5	8138	214388	214286	135	6960	11
IUS-ASE (LAUNCH - RETURN)	5843	1136.2	-1.1	395.7	6189	20758	24602	-2536	1428	-71
MV0712A SMCH CABLE	786	758.0	-13.0	340.0	64	5141	5102	0	0	0
P/L RECORDER	60	421.0	-6.0	378.0	0	0	0	0	0	0
P/L RETENTION FITTINGS	451	1224.8	-38.9	360.8	1760	107	1163	571	683	-130
WT GROWTH ALLOWANCE	207	1136.4	-1.1	395.7	773	6549	6541	0	0	0
INSAT 1-B/ASE	2394	753.5	11.5	368.8	2106	1024	1896	0	0	152
MV0702A P/L TIMING BUFFER	3	421.0	-6.0	378.0	0	0	0	0	0	0
PRIMARY PAYLOAD	54596	1044.8	-.0	394.9	20321	326692	331517	-3681	15495	60
MV0570A ACIP	182	1154.6	-12.7	295.6	12	825	825	53	-51	-5
MV0581A ACIP/OEX RECORDER	95	440.8	3.2	309.0	3	2	2	0	0	0
CFES	764	463.5	-56.2	362.3	0	0	0	0	0	0
ANCILLARY PAYLOAD	1041	582.3	-43.2	345.8	295	16603	16540	859	-1395	-135
TOTAL PAYLOAD CHARGEABLE	55637	1036.2	-.9	393.9	21557	391006	395647	1576	19105	391
MV0082A RMS ARM	-935	928.5	-83.9	444.5	75	9135	9191	-353	-21	14
GALLEY	-164	469.0	-67.0	367.0	14	14	3	0	0	0
H2O DISPENSING SYSTEM	23	470.1	-69.0	367.3	2	2	1	0	0	0
MANIFEST ITEMS	-1076	868.3	-81.6	434.3	254	14894	14789	-561	922	-20
MV0073A P/L ATTACH HDW	1915	973.5	0.0	379.2	3497	17335	19309	0	689	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	30	30	0	0	0
MV0073A P/L I/F HDW ALLOW	-451	1224.8	-38.9	360.8	1760	107	1163	-571	-683	130
MV0400A MADS 1	4	895.1	30.1	318.1	839	11919	12387	210	-91	-78
MV0408A MADS 2	653	897.1	31.8	318.2	838	11959	12486	231	-96	-77
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.-PAR	208	878.6	1.0	296.6	232	708	910	-136	-5	-17
MV0548A CCTV	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0711A X603 I/F HARNESS	86	590.7	-22.2	378.4	116	15	109	1	0	-1
MV0712A SMCH CABLE	2	941.0	0.0	307.0	0	0	0	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	19	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
STS OPERATOR	2462	870.6	4.7	378.5	6142	50584	51407	1539	3679	-923
PRIMARY PAYLOAD	54596	1044.8	-.0	394.9	20321	326692	331517	-3681	15495	60
ANCILLARY PAYLOAD	1041	582.3	-43.2	345.8	295	16603	16540	859	-1395	-135
MANIFEST ITEMS	-1076	868.3	-81.6	434.3	254	14894	14789	-561	922	-20
STS OPERATOR	2462	870.6	4.7	378.5	6142	50584	51407	1539	3679	-923
CARGO MODULE TOTAL	57023	1032.2	.9	392.5	25630	434246	438554	124	24729	532

TABLE STS-9 A-5.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/27 13.10.40

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-102 STS-9 INERT	154782	TBD								
SSME X3 INERT	20859	1495.0	.3	384.7	23734	19371	17736	-24	-2497	104
BOUYANCY	80	1116.0	-0.0	367.8	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	179335	TBD								
NON-PROP CONSUM AT SRB IGN	6278	996.5	-4.3	340.6	11141	124772	126322	-1197	16191	-42
MPS PROPELLANT AT SRB IGN	6166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	7750	1432.7	-95.0	476.4	1685	1205	1202	11	9	580
OMS PROPELLANT - RIGHT	7750	1432.7	95.0	476.4	1685	1205	1202	-11	9	-580
RCS PROPELLANT - FWD	2464	317.2	5.4	365.4	196	17	210	-2	5	-1
RCS PROPELLANT - AFT	5424	1347.7	0.0	470.9	6160	956	6718	0	97	0
ORBITER MODULE TOTAL AT SRB IGN	214167	TBD								
CARGO MODULE TOTAL	33904	1024.4	-.1	384.6	32167	275856	275016	-5057	11820	1899
ORBITER PLUS CARGO AT SRB IGN	248071	TBD								
ET LWT-3 INERT	68396	1351.2	2.6	424.0	365193	4111342	4108809	3250	163894	6985
BOUYANCY	155	1351.2	2.6	424.0	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1641114	881.4	.6	402.1	447200	48073560	48013053	131071	584614	34672
SRB LEFT SEPARATION	182551	1806.6	-250.9	401.0	185801	11363238	11367021	-21655	7537	949
SRB LEFT INFLIGHT LOSSES	1116436	1697.0	-250.5	400.0	737230	35500269	35500285	872	-38	-1
SRB LEFT MODULE TOTAL	1298987	1712.4	-250.6	400.1	923070	47270328	47274098	-22267	11211	934
SRB RIGHT SEPARATION	182551	1806.6	250.9	401.0	185801	11363238	11367021	21655	7537	-949
SRB RIGHT INFLIGHT LOSSES	1116436	1697.0	250.5	400.0	737230	35500269	35500285	-872	-38	1
SRB RIGHT MODULE TOTAL	1298987	1712.4	250.6	400.1	923070	47270328	47274098	22268	11211	-933

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

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TABLE STS-09 A-5 2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 08.37.35

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
S/L 1 CARRIER	13755	996.0	-.8	385.9	12343	63536	64294	158	-368	-118
S/L 1 EXPERIMENTS	13819	1115.7	1.0	405.6	8631	56415	58900	-1248	-193	-266
S/L INTERFACE CABLE	937	941.8	-34.9	357.8	590	2292	1152	0	0	0
ARS DUCT	22	621.0	0.0	357.9	1	1	1	0	0	0
AIRLOCK TUNNEL ADAPTER	900	621.0	0.0	357.9	228	333	221	0	0	0
AIRLOCK INSIDE MOD	100	652.0	0.0	357.9	6	3	3	0	0	0
MV0073A P/L ATTACH HDW	1502	1144.5	9.5	372.7	2616	4587	5830	-615	369	96
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	30	30	0	0	0
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW	722	949.6	-2.6	300.3	1058	2173	3145	-1020	-31	23
MV0525A EPS TANK SET 4 CRYO	873	1046.8	-61.3	299.1	420	540	958	-475	-24	21
MV0610A MID-DECK SEAT -5	101	543.0	-48.7	346.0	0	0	0	0	0	0
MV0702A P/L TIMING BUFFER	3	421.0	-6.0	378.0	0	0	0	0	0	0
PERSONNEL	493	522.0	15.1	391.1	0	0	0	0	0	0
PRIMARY PAYLOAD	32907	1032.5	-2.6	388.4	31843	238521	239703	-2467	9386	1072
MV0570A ACIP	182	1173.1	-11.3	293.4	10	683	683	40	-39	-3
ANCILLARY PAYLOAD	182	1173.1	-11.3	293.4	10	683	683	40	-38	-2
TOTAL PAYLOAD CHARGEABLE	33089	1033.3	-2.7	387.9	32209	240329	241161	-2474	8825	1101
MV0082A RMS ARM	-1001	922.4	-82.8	444.5	97	9676	9738	-428	-23	19
DELETIONS	-173	507.3	1.2	434.0	2	4	2	0	0	0
MANIFEST ITEMS	-1174	861.2	-70.4	443.0	327	15169	15451	-1537	116	-8
MV0400A MADS 1	94	1139.7	-40.3	405.7	44	39	37	-10	9	-15
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0548A CCTV	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0566A EPS T/S 5 HDW.	684	949.0	0.0	300.0	0	0	0	0	0	0
MV0578A DAC WIRING	5	808.9	-68.7	386.3	4	81	79	-5	-8	1
MV0610A MID-DECK SEAT - 6	101	490.0	-10.0	346.0	0	0	0	0	0	0
MV0711A X603 I/F HARNESS	86	590.7	-22.2	378.4	116	15	109	1	0	-1
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
MV0725A SIP SMCH	38	553.9	57.6	398.0	2	1	1	0	0	1
PERSONNEL	493	522.0	15.1	391.1	0	0	0	0	0	0
AUXILIARY O2 SYS. HDW.	75	794.0	89.0	329.0	2	2	0	0	0	0
BALLAST PROVISIONS	22	1508.0	0.0	277.9	7	0	7	0	0	0
P/L UMBIL. + OEX PROV.	26	749.1	-1.4	351.4	30	1079	1094	4	6	-1
STS OP CHARGEABLE CARGO	1989	780.1	.8	363.8	2091	31851	31067	-954	-1690	-182
PRIMARY PAYLOAD	32907	1032.5	-2.6	388.4	31843	238521	239703	-2467	9386	1072
ANCILLARY PAYLOAD	182	1173.1	-11.3	293.4	10	683	683	40	-38	-2
MANIFEST ITEMS	-1174	861.2	-70.4	443.0	327	15169	15451	-1537	116	-8
STS OP CHARGEABLE CARGO	1989	780.1	.8	363.8	2091	31851	31067	-954	-1690	-182
CARGO MODULE TOTAL	33904	1024.4	-.1	384.6	32167	275856	275016	-5057	11820	1899

TABLE STS-11 A-6.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/27 16.11.02

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-102 STS-11 INERT	154782	TBD								
SSME X3 INERT	20859	1495.0	.3	384.7	23734	19371	17736	-24	-2497	104
BOUYANCY	80	1059.8	-0.0	364.8	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	179335	TBD								
NON-PROP CONSUM AT SRB IGN	5456	999.7	3.7	346.8	9938	126378	127404	-1692	15998	-479
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	9750	1426.0	-94.7	476.0	2099	1739	1727	7	21	725
OMS PROPELLANT - RIGHT	9750	1426.0	94.7	476.0	2099	1739	1727	-7	21	-725
RCS PROPELLANT - FWD	2464	317.2	5.4	365.4	196	17	210	-2	5	-1
RCS PROPELLANT - AFT	5424	1347.7	0.0	470.9	6160	956	6718	0	97	0
ORBITER MODULE TOTAL AT SRB IGN	217345	TBD								
CARGO MODULE TOTAL	34149	1033.1	-1.2	386.2	14851	324825	325851	5609	711	-71
ORBITER PLUS CARGO AT SRB IGN	251494	TBD								
ET LWT-5 INERT	67866	1352.1	2.6	424.1	363248	4058338	4054307	3588	163895	6983
BOUYANCY	155	1352.1	2.6	424.1	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1640584	881.3	.6	402.1	445264	48007743	47945728	131328	584420	34668
SRB LEFT SEPARATION	181604	1809.4	-250.8	401.1	185009	11266086	11269711	-22594	5508	929
SRB LEFT INFLIGHT LOSSES	1116436	1697.0	-250.5	400.0	737230	35500316	35500306	853	-48	0
SRB LEFT MODULE TOTAL	1298040	1712.7	-250.5	400.2	922283	47192371	47195948	-22877	9628	918
SRB RIGHT SEPARATION	181604	1809.4	250.8	401.1	185009	11266086	11269711	22594	5508	-929
SRB RIGHT INFLIGHT LOSSES	1116436	1697.0	250.5	400.0	737230	35500316	35500306	-853	-48	0
SRB RIGHT MODULE TOTAL	1298040	1712.7	250.5	400.2	922283	47192371	47195948	22878	9628	-917

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-11 A-6 2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 09.16.34

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
PALAPA PAYLOAD	7531	1242.1	0.0	383.4	0	0	0	0	0	0
DEPLOYED/USEABLE PAYLOAD	7531	1242.1	0.0	383.4	0	0	0	0	0	0
PALAPA CARRIER	2394	1241.3	11.5	368.8	2106	1024	1896	0	0	152
PDRS/PFTA	8500	1010.0	0.0	400.0	0	0	0	0	0	0
LFC-1 + CARRIER	4000	1122.1	4.6	400.6	0	0	0	0	0	0
PRIMARY PAYLOAD	22425	1132.6	2.0	391.2	2749	54867	55229	604	-4710	56
MV0402A FWD. FUSE. INSTR.	36	435.0	-52.0	365.0	0	0	0	0	0	0
MV0403A SUMS	85	280.0	-11.0	337.0	0	0	0	0	0	0
MV0560A SILTS	410	1196.8	0.0	410.0	0	0	0	0	0	0
MV0570A ACIP	182	1173.1	-11.3	293.4	10	683	683	40	-39	-3
MV0577A SEADS	101	455.6	0.0	336.9	0	0	0	0	0	0
MV0581A ACIP/OEX RECORDER	95	440.8	3.2	309.9	3	2	2	0	0	0
MV0702A P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
GET AWAY SPECIAL - BF 2,3,4	5284	720.9	0.0	395.5	0	2471	2471	0	0	0
PCM SLAVE	13	273.0	-24.0	327.0	0	0	0	0	0	0
ANCILLARY PAYLOAD	6209	748.2	-.8	390.1	743	38862	38195	94	409	58
TOTAL PAYLOAD CHARGEABLE	28634	1049.3	1.4	391.0	3502	248804	248507	1853	-3855	117
DELETIONS	-173	507.3	1.2	434.0	2	4	2	0	0	0
MANIFEST ITEMS	-173	507.3	1.2	434.0	2	4	2	0	0	0
MV0073A P/L ATTACH HDW	2627	1069.3	0.0	376.7	4739	12923	15442	0	-639	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	30	30	0	0	0
MV0400A MADS 1	94	1139.7	-40.3	405.7	44	39	37	-10	9	-15
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.	722	949.6	-2.6	300.3	1058	2173	3145	-1020	-31	23
MV0548A CCTV	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS TEST-VTR	65	560.5	-38.3	442.3	8	2	8	0	0	3
MV0566A EPS TANK SET 5 HDW	684	949.0	0.0	300.0	0	0	0	0	0	0
MV0578A DAC WIRING	5	884.0	-79.9	370.6	2	54	53	-2	-3	0
MV0711A X603 I/F HARNESS	86	590.7	-22.2	378.4	116	15	109	1	0	-1
MV0712A SMCH CABLE	702	758.0	-13.0	340.0	64	5141	5102	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD SW PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
BALLAST PROVISIONS	22	1508.0	0.0	278.0	0	0	0	0	0	0
MMU	600	610.0	-80.0	400.0	0	0	0	0	0	0
AUXILLARY O2 HDW	75	794.0	89.0	329.0	2	2	2	0	0	0
P/L UMBIL + OEX PROV	26	749.1	-1.4	351.4	30	1079	1094	4	6	0
STS OP CHARGEABLE CARGO	5688	935.9	-14.6	363.5	10399	72432	74181	1850	437	-636
PRIMARY PAYLOAD	22425	1132.6	2.0	391.2	2749	54867	55229	604	-4710	56
ANCILLARY PAYLOAD	6209	748.2	-.8	390.1	743	38862	38195	94	409	58
MANIFEST ITEMS	-173	507.3	1.2	434.0	2	4	2	0	0	0
STS OP CHARGEABLE CARGO	5688	935.9	-14.6	363.5	10399	72432	74181	1850	437	-636
CARGO MODULE TOTAL	34149	1033.1	-1.2	386.2	14851	324825	325851	5609	711	-71

TABLE STS-12 A-7.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/28 14.05.11

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-103 STS-12 INERT	147985	1059.9	-.5	365.5	805776	5054864	5351393	4231	80284	-1313
SSME X3 INERT	20859	1495.0	.3	384.7	23734	19371	17736	-24	-2497	104
BOUYANCY	80	1061.3	-.9	364.5	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	172538	1101.4	-.1	368.3	833361	6093504	6386968	-151	101561	-676
NON-PROP CONSUM AT SRB IGN	5418	1001.9	3.0	347.0	9872	126162	127130	-1545	15969	-459
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	10550	1423.5	-94.9	476.1	2296	2045	2027	4	30	794
OMS PROPELLANT - RIGHT	10550	1423.5	94.9	476.1	2296	2045	2027	-4	30	-794
RCS PROPELLANT - FWD	2477	317.2	5.4	365.4	196	17	210	-2	5	-1
RCS PROPELLANT - AFT	5031	1347.7	0.0	470.9	6160	956	6718	0	97	0
ORBITER MODULE TOTAL AT SRB IGN	211730	1135.0	.3	380.6	957719	7218095	7500747	-3406	283907	-1897
CARGO MODULE TOTAL	52256	1060.8	1.8	397.7	22281	284161	287990	-8252	5782	520
ORBITER PLUS CARGO AT SRB IGN	263986	1120.3	.6	383.9	982681	7554737	7838580	-12695	278178	-1136
ET LWT-6 INERT	67866	1352.1	2.6	424.9	363248	4058388	4054307	3588	163895	6983
BOUYANCY	155	1352.1	2.6	424.9	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1640584	881.3	.6	402.2	445789	48008318	47945728	131328	589950	34691
SRB LEFT SEPARATION	178028	1807.0	-250.8	401.1	132625	11145535	11149154	-22604	5608	929
SRB LEFT INFLIGHT LOSSES	1117163	1696.8	-250.5	400.0	738057	35510098	35510105	825	-44	0
SRB LEFT MODULE TOTAL	1295191	1711.9	-250.5	400.2	870725	47058174	47061763	-22874	9582	918
SRB RIGHT SEPARATION	178028	1807.0	250.8	401.1	132625	11145535	11149154	22604	5608	-929
SRB RIGHT INFLIGHT LOSSES	1117163	1696.8	250.5	400.0	738057	35510098	35510105	-825	-44	0
SRB RIGHT MODULE TOTAL	1295191	1711.9	250.5	400.2	870725	47058174	47061763	22875	9582	-917

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-12 A-7 2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/29 09.41.08

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
TWO-STAGE IUS	32507	1132.8	.1	399.9	6665	17967	18105	73	-18	-3
TDRS-B SPACECRAFT	5000	965.4	.3	399.6	1188	1734	1779	34	9	12
DEPLOYABLE PAYLOAD	37507	1110.5	.1	399.9	7853	45912	46095	7o	38	9
IUS-ASE (LAUNCH - RETURN)	5843	1136.2	-1.1	395.7	6189	20758	24602	-2536	1428	-71
MV0712A SMCH CABLE	786	758.0	-13.0	340.0	64	5141	5102	0	0	0
P/L RECORDER	60	421.0	-6.0	378.0	0	0	0	0	0	0
MV0073A P/L RETENTION FITTINGS	451	1224.8	-38.9	360.8	1760	107	1163	571	683	-130
WT GROWTH ALLOWANCE	207	1136.2	-1.1	395.7	773	6549	6541	0	0	0
MEA-1 PAYLOAD	4165	764.8	-3.5	419.9	0	0	0	0	0	0
MEA-1 CARRIER	1185	775.9	0.0	386.0	0	0	0	0	0	0
MV0702A P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
PRIMARY PAYLOAD	50207	1071.7	-.9	399.4	18016	228982	233007	-791	94	27
GET AWAY SPECIAL - BF 2	884	664.5	78.8	404.0	0	0	0	0	0	0
ANCILLARY PAYLOAD	884	664.5	78.8	404.0	0	0	0	0	0	0
TOTAL PAYLOAD CHARGEABLE	51091	1064.6	.5	399.5	19211	260070	265281	-6874	-258	96
MV0082A RMS ARM	-935	928.5	-83.9	444.5	75	9135	9191	-353	-21	14
MANIFEST ITEMS	-935	928.5	-83.9	444.5	75	9135	9191	-352	-20	14
MV0073A P/L ATTACH HDW	1701	1014.0	0.0	376.0	3057	12294	13893	0	836	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	30	30	0	0	0
MV0073A P/L I/F HDW ALLOW	-451	1224.8	-38.9	360.8	1760	107	1163	-571	-683	130
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.	717	945.5	3.2	300.7	1016	2069	2997	-945	-28	22
MV0548A CCTV	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0711A X603 I/F HARNESS	86	590.4	-20.7	378.4	119	15	112	0	0	-1
MV0712A SMCH CABLE	2	941.0	0.0	307.0	0	0	0	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
STS OPER CHARGEABLE CARGO	2100	909.4	-3.4	376.2	4795	26406	26332	257	3223	-396
PRIMARY PAYLOAD	50207	1071.7	-.9	399.4	18016	228982	233007	-791	94	27
ANCILLARY PAYLOAD	884	664.5	78.8	404.0	0	0	0	0	0	0
MANIFEST ITEMS	-935	928.5	-83.9	444.5	75	9135	9191	-352	-20	14
STS OPER CHARGEABLE CARGO	2100	909.4	-3.4	376.2	4795	26406	26332	257	3223	-396
CARGO MODULE TOTAL	52256	1060.8	1.8	397.7	22281	284161	287990	-8252	5782	520

TABLE STS-13 A-8.1 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 82/09/28 13.51.25

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
ORBITER OV-099 STS-13 INERT	150104	1061.3	.1	365.4	814658	5101952	5401108	3878	85598	-2647
SSME X3 INERT	20816	1495.0	.3	384.5	23700	19289	17706	-24	-2487	104
BOUYANCY	80	1115.7	0.0	367.7	0	0	0	0	0	0
PERSONNEL 4M/7D	3614	529.0	15.7	390.3	1811	9329	9537	1456	821	196
ORBITER W/O CONSUMABLES	174614	1102.0	.4	368.2	842183	6136110	6432248	-1309	106527	-2062
NON-PROP CONSUM AT SRB IGN	5418	1001.9	3.0	347.0	9872	126162	127130	-1545	15969	-459
MPS PROPELLANT AT SRB IGN	5166	1404.5	6.8	352.7	4149	5527	5037	-1004	1041	-418
OMS PROPELLANT - LEFT	12531	1417.2	-94.7	475.9	2724	2853	2823	-9	55	946
OMS PROPELLANT - RIGHT	12531	1417.2	94.7	475.9	2724	2853	2823	9	55	-946
RCS PROPELLANT - FWD	2446	317.8	5.3	365.3	284	17	297	-2	5	-1
RCS PROPELLANT - AFT	4970	1345.4	0.0	470.5	8709	1053	9197	0	98	0
ORBITER MODULE TOTAL AT SRB IGN	217676	1139.7	.7	382.0	985040	7312907	7600644	-5271	308080	-3565
CARGO MODULE TOTAL	37027	954.2	-1.7	397.1	12163	167087	168193	2804	-1160	-564
ORBITER PLUS CARGO AT SRB IGN	254703	1112.8	.3	384.2	998798	7716656	8003980	516	287788	-4371
ET LWT-7 INERT	67217	1358.0	2.6	424.3	360246	3999669	3995675	3340	161851	6939
BOUYANCY	155	1358.0	2.6	424.3	0	0	0	0	0	0
MPS FUEL AT SRB IGN	227021	1613.4	0.0	400.0	0	3634733	3634733	0	0	0
MPS LOX AT SRB IGN	1345119	734.0	.6	401.4	74476	4471704	4421107	135445	313859	26977
MPS PRESSURANT	423	753.6	0.0	400.0	0	17697	17697	-12	-27	0
ET MODULE TOTAL AT SRB IGN	1639935	881.4	.6	402.1	442323	47999375	47937335	131120	584199	34624
SRB LEFT SEPARATION	178028	1807.0	-250.8	401.1	132625	11145535	11149154	-22604	5608	929
SRB LEFT INFLIGHT LOSSES	1117163	1696.8	-250.5	400.0	738057	35510098	35510105	925	-44	0
SRB LEFT MODULE TOTAL	1295191	1711.9	-250.5	400.2	870725	47058174	47061763	-22874	9582	918
SRB RIGHT SEPARATION	178028	1807.0	250.8	401.1	132625	11145535	11149154	22604	5608	-929
SRB RIGHT INFLIGHT LOSSES	1117163	1696.8	250.5	400.0	738057	35510098	35510105	-825	-44	0
SRB RIGHT MODULE TOTAL	1295191	1711.9	250.5	400.2	870725	47058174	47061763	22875	9582	-917

ORBITER AND CARGO IN ORBITER COORDINATE SYSTEM, ET AND SRB IN SHUTTLE COORDINATE SYSTEM

TABLE STS-13 A-8.2 -- VEHICLE SUMMARY WEIGHT STATEMENT -- 8_/09/29 09.50.06

DESCRIPTION	WEIGHT LB	CENTER-OF-GRAVITY,IN. X	Y	Z	MOMENTS-OF-INERTIA,SF2 IXX	IYY	IZZ	PRODUCTS-OF-INERTIA,SF2 PXY	PXZ	PYZ
LDEF	22000	893.1	0.0	400.0	0	0	0	0	0	0
DEPLOYED/USEABLE PAYLOAD	22000	893.1	0.0	400.0	0	0	0	0	0	0
SMM REPAIR PAYLOAD	10000	1119.6	0.0	386.5	0	0	0	0	0	0
MMU	600	610.0	-80.0	400.0	0	0	0	0	0	0
MV0702A P/L TIMING BUFFER	3	516.0	-62.0	432.0	0	0	0	0	0	0
PRIMARY PAYLOAD	32603	957.3	-1.5	395.9	1089	92447	92989	3616	-4737	-43
MV0570A ACIP	182	1154.6	-12.7	295.6	12	825	825	53	-51	-5
MV0581A ACIP RECORDER	95	440.8	3.2	309.0	3	2	2	0	0	0
ANCILLARY PAYLOAD	277	909.8	-7.2	300.2	21	7694	7695	-99	-179	-1
TOTAL PAYLOAD CHARGEABLE	32880	956.9	-1.5	395.1	1654	100817	100820	3532	-4646	-11
MV0073A P/L ATTACH HDW	1940	1035.4	0.0	377.3	3511	5755	7648	0	416	0
MV0073A ORB RET FTG ALLOW	-675	1074.0	26.0	395.0	2	30	30	0	0	0
MV0400A MADS 1	4	895.1	30.1	318.1	839	11919	12387	210	-91	-78
MV0408A MADS 2	653	897.1	31.8	318.2	838	11959	12486	231	-96	-77
MV0412A S-BAND FM	22	553.9	57.6	398.0	2	1	1	0	0	1
MV0520A ATCS RADIATOR KIT	355	1214.9	-.1	473.3	360	237	550	0	0	0
MV0525A EPS TANK SET 4 HDW.	717	945.5	3.2	300.7	1016	2069	2997	-945	-28	22
MV0548A CCTV CAMERAS	72	968.5	-14.3	438.0	98	1915	2012	-432	-1	0
MV0550A AFT STATION CONTAINERS	48	541.0	-54.0	445.0	2	5	4	0	0	0
MV0564A PD+RS SYS. TEST-VTR	65	560.0	-49.9	440.1	1	1	1	0	0	0
MV0711A X603 I/F HARNESS	86	590.4	-20.7	378.4	119	15	112	0	0	-1
MV0712A SMCH CABLE	702	758.0	-13.0	340.0	64	5141	5102	0	0	0
MV0713A 1307 B/H PAYLOAD WIRING	97	1272.1	-10.4	473.0	95	55	102	18	20	6
MV0719A AFD WIRING HARNESS	40	527.0	0.0	440.0	0	0	0	0	0	0
MV0720A P/L RECDR. CABLE	1	415.0	-40.0	390.0	0	0	0	0	0	0
MV0722A STD. SW. PANEL	20	560.0	-47.0	446.0	0	0	0	0	0	0
STS OP CHARGEABLE CARGO	4147	932.1	-3.1	359.8	9521	64796	66883	-760	2792	-598
PRIMARY PAYLOAD	32603	957.3	-1.5	395.9	1089	92447	92989	3616	-4737	-43
ANCILLARY PAYLOAD	277	909.8	-7.2	300.2	21	7694	7695	-99	-179	-1
STS OP CHARGEABLE CARGO	4147	932.1	-3.1	359.8	9521	64796	66883	-760	2792	-598
CARGO MODULE TOTAL	37027	954.2	-1.7	391.1	12163	167087	168193	2804	-1160	-564

TABLE A-9 - ORBITER DEFINITION - WEIGHT & C.G.

VEHICLE	REFERENCE	WEIGHT (LBS)	X0 (IN.)	Y0 (IN.)	Z0 (IN.)
OV-102 OPERATIONAL INERT	STATUS - TABLE 4.1	153083	1060.9	-0.3	366.4
OV-099 OPERATIONAL INERT	STATUS - TABLE 4.1	150191	1061.3	-0.1	365.4
OV-103/104 INERT	STATUS - TABLE 4.1	148065	1059.9	-0.5	365.5

INCLUDED IN INERT WEIGHT*			MANIFEST MODIFICATIONS ITEM	WEIGHT (LBS)	X0 (IN.)	Y0 (IN.)	Z0 (IN.)
OV-102 OPER	OV-099 OPER	OV-103/104 OPER					
X	X	X	ORBITER RETENTION FTG ALLOWANCE	675	1074.0	26.0	395.0
X	X	X	RENDEZVOUS RADAR (Ku BAND)	359	589.0	69.0	424.0
X	X	X	MISSION SPEC SEAT	101	541.0	23.0	433.0
X	X	X	P/L SPEC SEAT	101	543.0	0.0	433.0
			RMS CLOSEOUT PANEL (1)	6	560.5	30.5	453.0
X	X	X	RMS	941	926.2	-83.5	444.6
X			EPS TNK SET 3-TANKS	604	1048.4	-14.8	299.4
	X	X	EPS TNK SET 3-TANKS	594	1048.4	-14.8	299.4
X	X	X	GALLEY	164	469.0	-67.0	367.0

*X Denotes items included in Inert Weight
(1) When RMS installation is removed closeout panel added.

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